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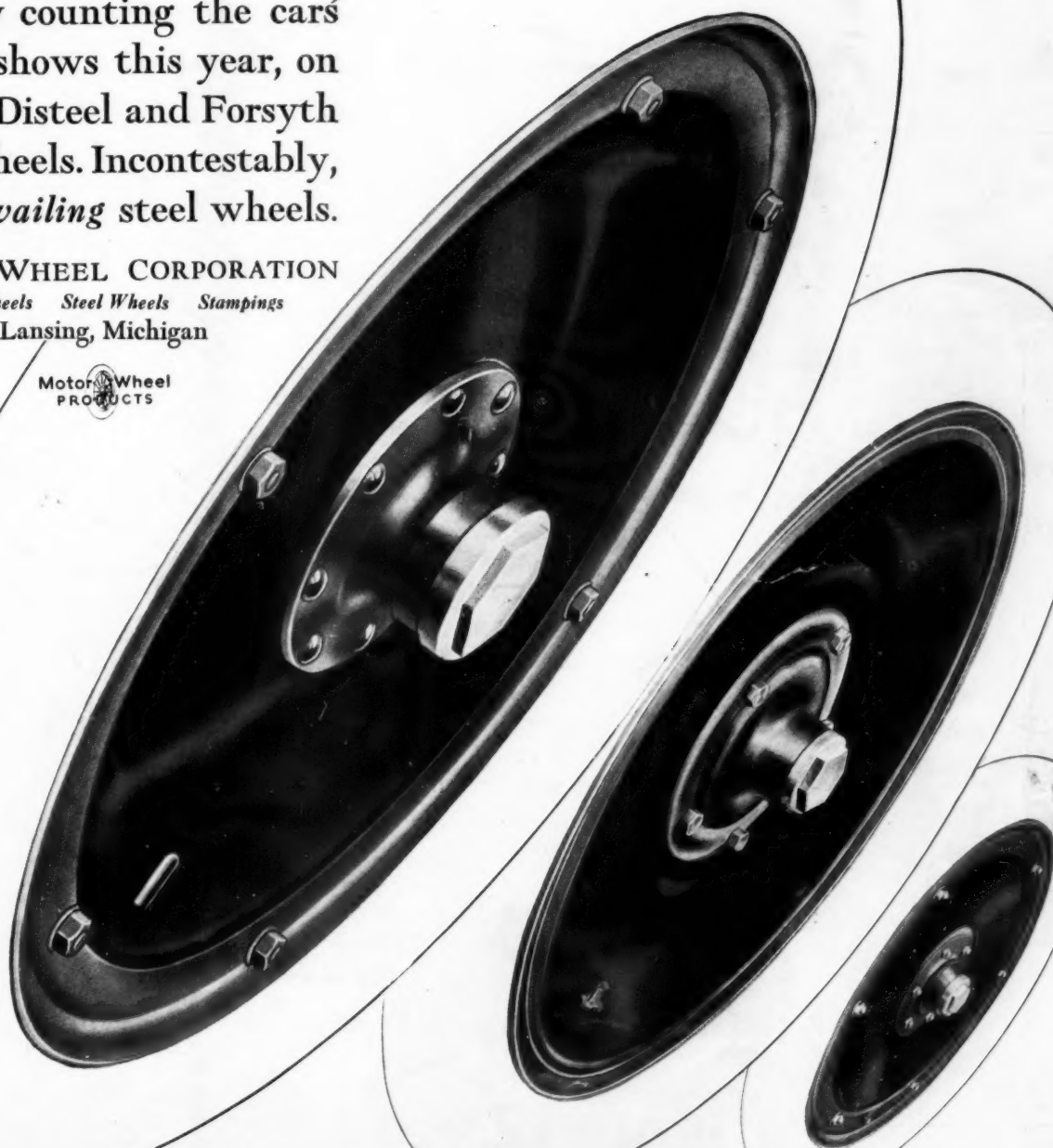
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# AUTOMOTIVE INDUSTRIES

*The* AUTOMOBILE

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## Present Day Cars Are Good, But —They Can Be Made Better

Buyers are demanding constant improvements to enhance comfort, economy and dependability. Competition requires new talking points. Betterments now considered.

By Herbert Chase

**C**OMPARE the car of today with that of a decade ago and it will be appreciated that many changes in design have been made to benefit the user. Basically today's vehicle differs but little from its prototype yet it incorporates many refinements which indicate that American automobile builders have done their full share in advancement of the art.

It does not follow, by any means, that present cars have attained perfection, even though the present type has undergone continual refinement for many years. There are still many details which can be improved and even a minor change for the better will not escape notice in a country in which every eighth person owns a car.

A few years ago one often heard it said that the public is no longer interested in mechanical changes in automobile construction, that they cared only for performance, regardless of how it was attained. If this was true, there seems to have been a decided change in attitude if one can judge by the interest now being manifested in front-wheel brakes.

Users are interested in performance and convenience in operation, but at least a large percentage like

to know, also, how improvements are attained. Sales organizations know this and appreciate good "talking points," especially when they are based on easily demonstrated facts.

Intelligent laymen do not need a chart and compass to understand the advantage of comfortable seats, ample leg room, heaters for winter and ventilators for warm weather, properly fitted curtains which are put on easily and form a reasonably tight inclosure when they are up, batteries which last longer and the like.

All of these are desirable if not essential, but it is not beyond the bounds of possibility that we shall see in the near future developments of a much more striking and impor-

tant character. In any case such an eventuality will bear careful scrutiny.

The inclination may be to affirm that the industry wants nothing to do with innovations—that it now is organized to build a well-developed type of vehicle and is not inclined to jump to something new even though considerable advantage seem to be attainable. This is a conservative attitude, but there are indications that many makers are casting about for

**A** PRODUCT which is kept up to date or a step in advance of competing lines but which is, at the same time, sufficiently well developed to avoid trouble, is much easier to sell than one which is allowed to become gradually obsolete.

This article points the way to various improvements in design, many of which, if put into effect, will furnish excellent sales arguments. It should provide food for thought in executive and sales as well as engineering departments.

selling features which will differentiate their products from those of competing makers and at the same time give the purchaser a car which is easier to drive, more comfortable to ride in, lower in first cost and less expensive to maintain.

Competition often forces improvements, the need for which sometimes is lost sight of in periods during which demand equals or exceeds supply. Close students of automobile construction well know that even the best of present cars could be improved and it is probable that the concerns which first realize and put into effect improvements which are basically sound will profit accordingly.

### Weight Increases Cost

The fact that modern cars weigh from two to five times as much as the passenger load they are intended to carry has been made the occasion for adverse comment as to the present status of engineering development and there does seem to be something anomalous in transporting from 300 to 750 lb. of vehicle for each passenger, even in open cars seating five or seven persons.

Taken alone, such a statement does not mean very much, but considered in the light of some other facts it begins to have significance. Rightly or wrongly, first cost appears to be a prime factor controlling the sale of passenger cars to the consumer. A few consider quality or cost per mile first, but the vast majority of buyers purchase the cheapest reputable makes of car which fulfill their needs. Consequently the manufacturer makes a minimum selling price and to do so cuts his net cost per car as low as he can and still retain a reputation for giving good value.

Cost of materials, raw, semi-finished and finished, is a very large item in first cost for the vehicle manufacturer. Some place it is as high as 90 per cent. It is exceedingly important, therefore, to make the cost of material as low as possible. Many materials which enter into car construction are bought on a weight basis, hence it is evident that saving in weight is a primary consideration, so long as reasonable durability, dependability and good riding qualities are not sacrificed and production cost is not increased inordinately. Granting this, the logical question is, What feasible methods not now employed can be used to reduce weight?

### Effect of Balloon Tires

Many parts of the car are made today far heavier than they need be if not required to withstand shock. Eliminate or materially reduce shock and these parts can be made much lighter and still have adequate strength for the load they must carry. We have used pneumatic tires to reduce shock ever since automobiles first were built, but it seems never to have been realized generally to what extent shock could be lessened by decreasing inflation pressure and incidentally designing the tire to function properly and be durable under these conditions.

This brings us to consideration of the effect which balloon tires may have on car design. One prominent engineer, connected with a large manufacturer of passenger cars, is reported to have said that he could take a thousand pounds out of a 4000-lb. car his concern is building by redesigning it to use balloon tires instead of the conventional cord type. What this means in the case of a car which sells for about 75 cents a pound is not difficult to appreciate.

To state the matter briefly, balloon tires appear to open the way for radical reductions in car weight. Appreciation of this situation probably has not been very widespread as yet, but is likely to be a powerful influence

toward one pronounced change in design in the near future.

Fortunately the balloon tire is a step toward easier riding and probably toward greater safety in operation, two factors which have a powerful influence upon sales, for they are appreciated readily by the purchaser.

Next in importance to balloon tires as innovations of considerable interest are substitutes for the conventional gearset. Four-wheel brakes may be considered as an accomplished fact rather than a future development.

In spite of a popular misapprehension to the contrary, the modern sliding change speed gear is a thoroughly good piece of engineering and will be hard to beat from the standpoint of simplicity and dependability, as is indicated by its practically universal employment (except by Ford) in cars of both American and European design. It cannot be denied, however, that there is room for improvement in such a gearset or for a substitute which will be practically noiseless and which will not demand the inconvenience in operation which the present type entails, especially for the unskilled user.

In France and England considerable experimental work has been done with gearset substitutes some of which are termed torque converters and in which the torque ratio—the equivalent of gear ratio—is changed automatically with the resistance to motion of the vehicle.

### Gearset Substitutes

With these devices the engine speed remains constant so long as the throttle is not touched, but the vehicle speed decreases when a greater resistance to motion, such as an upgrade or a soft footing, is encountered. Consequently the driver need operate only the accelerator to get the desired speed, within the limits of power available, and has no gearshifting to think about. Even the clutch can be dispensed with or used only to disconnect the engine from the driving mechanism when the engine continues to run with the car standing still.

Voisin has been developing a device of this character patented by Lavaud (described in *AUTOMOTIVE INDUSTRIES*, Oct. 25, 1923) and recently has announced the intention to market a car fitted with it. In England, G. Constantinesco, an engineer with some accomplishments to his credit, has worked on a device understood to accomplish similar results, but the exact nature of the mechanism employed has not yet been revealed for publication, although much interest has been created by various statements regarding it.

Whether or not torque converters of this type will find any wide application in this country remains to be seen. Early efforts in this field were abortive but modern methods of manufacture, many years of experience and improved materials available, have made possible many mechanisms which failed formerly for lack of these favorable factors. Should success be attained with this type of transmission, it would not only displace the gearset and rear axle bevel gearing and possibly the clutch, but might react on engine design because of the somewhat different engine characteristics which might prove desirable.

### Lighter Bodies

Under these circumstances we would have a quite different chassis than that now in general use and this change might be accomplished also by a revision in body design calculated to make bodies lighter and more flexible, both in structure and in their ready adaptation to a greater variety of uses.

Should the present type of gearset retain its popularity, as it may well do, we are likely to see some marked



improvements in means for operating it. Some American manufacturers already have appreciated, or, perhaps we might say, anticipated a demand for easier control by fitting semi-automatic control or devices intended to eliminate gear clashing, even though the operator is inexperienced. Devices of this character are to be commended so long as they do not add undue complication and expense or increase service costs.

It is not unlikely that the conventional arrangement of gear shift lever in the driver's compartment and directly over the gearset will be altered, either by substitution of a smaller control lever on steering column or instrument board or by the use of some sort of transmission which requires no hand operation.

### Effect of the Fuel Situation

Whether we shall see any marked changes in engine type or even in design is a question which it is impossible to answer with certainty. The industry has long resisted a shift to any other type than the conventional four-stroke throttling variety in spite of the fact that its characteristics are far from being ideally suited for vehicle propulsion.

Much depends, of course, upon the fuel situation of the future. No man could foresee the phenomenal overproduction of petroleum in the past year which has resulted in lower gasoline prices than many thought we should ever see again, nor can anyone foretell with certainty when the pendulum will swing the other way and produce a fuel stringency which will put a high premium on more economical engines.

Should this come about there might be some intensive development in types of construction which are highly commendable in themselves but in which it has been hard to create interest so long as the present conventional form of construction answered its purpose reasonably well. It may be, also, that means for overcoming some of the chief faults of present engines will be developed so that the type will be retained with certain modifications such as constant compression (through elimination of throttle as a control element) and positive distribution of fuel among cylinders.

Such possibilities are always in the offing and some are in the process of active development. It is risky to predict when they will come to the front. At almost any time some prominent maker might find it to his advantage to put something of this sort into production and profit by getting a step ahead of the procession. There is small doubt that if the industry set itself to the task it could come close to doubling the number of miles per gallon which most of the cars it builds today run under average conditions.

Some of the large concerns in the industry are known recently to have shown considerable interest in certain unconventional forms of engine which have been described in these columns and this alone indicates that those in authority are endeavoring not to overlook developments which might have a profound influence if taken up in a large way.

Superchargers have come in for a certain amount of attention and actually have been applied to one regular

model of German passenger car. There has been a little talk of interest in them in this country, but the writer, for one, has been unable to see much future for this means of increasing the power output of an automobile engine, even though it does enable the engine to operate with a better power factor, that is at an average load which is nearer to that of maximum economy than it would be if a larger engine, without supercharger, were employed.

Among the problems in engine design which are the subject of considerable study is that of preventing fuel dilution of crankcase oil. An important factor tending to prevent dilution is the temperature of the engine which, according to reliable test data, should be maintained as high as freedom from detonation will permit. Thermostatic control calculated to hold a uniform jacket water temperature is used extensively and evaporative cooling systems in which water is converted into steam and recondensed are receiving favorable consideration and seem to promise well. More is likely to be heard of them in the near future.

Other chassis parts may be expected to undergo at least a gradual development. Steering doubtless will be made easier in spite of balloon tires, by the use of greater reductions in steering gears, a better layout of the steering system and use of constructions, having less friction in moving parts.

There probably will be some radical improvements in riding qualities other than those realized through the use of balloon tires. Some of these may well come through the adoption of more comfortable upholstery. Pneumatic seat and back cushions are being tried in England and it has been suggested that seats with backs which move with

the passenger instead of remaining stationary while he slides up and down against it might be given a trial. Something of this sort has, in fact, been developed and is being exploited in this country.

American cars have longer springs and are, in general, more comfortable than those produced abroad where roads are often better than here, but there is still ample opportunity for improvement in riding qualities, however attained. Light cars, in particular, are open to much improvement in this respect.

### Unusual Spring Arrangements

Innumerable unusual arrangements of springs have been suggested. Some have given considerable promise of improvement and will bear further study. Certainly there is something to be said for an arrangement of springs placed transversely and substituted for some of the conventional axle parts, especially on light cars. Considerable saving of weight is said to be attained by such a construction, not in the springs, of course, but in spring-axle unit weight, and cars with this arrangement are said to ride remarkably well. There are, it is admitted, some disadvantages in this construction, but it remains to be seen whether they outweigh the advantages.

Substitutes for spring shackles and means for avoiding rapid wear and rattles when shackles are retained are still deserving and receiving much consideration. Non-metallic substances which give a cushioning action and require no lubrication already are used extensively.

**R**ADICAL changes in design are expensive and upset production programs, but a much worse state of affairs is created if failure to keep a product in step with demands of the purchaser for improvements affects sales to the extent that production must be greatly curtailed.

Sales organizations often demand and should be given features of construction which differentiate the manufactured product from that of competitors providing this is done with assurance that the features are sound fundamentally.

Changes in axle design doubtless would accompany revisions of other chassis parts. Some of these have been referred to above. Decreased weight and detail modifications such as more suitable differentials and what may prove to be better forms of gearing now are receiving attention in many experimental departments and deserve their share of development.

Braking systems undoubtedly have been bettered greatly, during the past year but still are subject to much improvement in respect to effectiveness, ease and certainty of operation and freedom from a high rate of wear and from squealing. It should not require emphasis that nothing tending toward greater safety in operation should be overlooked.

Interference of brakes with steering must be avoided and factors which contribute to skidding must be studied and reduced to a minimum. Anything which facilitates use of the engine in braking, such as means for changing easily to a lower gear even though the car has attained considerable momentum on a down grade, should not escape attention.

### Opinions Differ on Brake Equalizing

Some consider better brake equalizing highly important, while at least one prominent authority says that the elimination of all equalizers on four-wheel braking systems has proved advantageous. These opposing views demand and doubtless will have some sort of reconciliation. More or less promising forms of equalizers which differ from the conventional are being developed and are worthy of study. One of these aims to equalize braking effort rather than the pull applied to each pair of shoes.

Wheels and rims may undergo considerable change. Here again balloon tires will have their effect, it is believed, in decreasing weight. It is not improbable that we may see also some form of slightly resilient wheel, possibly incorporating some rubber parts, for example, but past history in this respect records almost innumerable failures.

At the present time there is much interest in the drop base rim which has the notable advantage that it enables the changing of tires with great facility without the use of any tools and without using a two piece or jointed rim construction.

Much of the excessive weight found in present day passenger cars is occasioned by a form of construction, especially in the body, which demands rigidity. Members which would be amply strong if made lighter are now made heavy simply to attain what is considered to be requisite stiffness. Many wooden parts are also made heavier than they would need to be otherwise, in order to permit the use of screws or to add stiffness calculated to prevent squeaks and rattles.

### Novel Bodies Given Attention

Mere statements of these facts raises the question whether a comparatively rigid structure is, after all, better suited to the purpose than a comparatively flexible one which presumably could be made lighter.

One form of fabric body which originated in France and has been adopted by a number of British as well as French makers, is attracting favorable comment. This is a light structure in which no two of the wooden body members are allowed to touch each other. Joints between adjacent wooden parts are made by strips of steel bolted through the wood. Seats are not attached to the body but to the chassis frame.

With this arrangement there is said to be not only a marked saving in body weight but an entire absence of drumming, rattles and squeaks. The structure is, however, less rigid than conventional types and would seem

to lend itself to use on a chassis which does not have to be as rigid as at present in order to prevent undue body distortion. Whether or not such a construction will fulfill the demands of American users remains to be seen.

It may well be that other forms of light body construction with equal or greater possibilities will be developed. All-metal bodies have found some favor, but not on the score of lightness and flexibility. One possibility is a combination of body and frame in such a way that the body becomes a structural part of the chassis and carries the weight of sprung chassis parts as well as passengers.

### Changes in Fender Material Possible

One of our readers has suggested the use of some form of fender which will not be so easily bent and marred as is the present type in minor collisions. An arrangement which would yield and spring back to normal position in such cases without showing adverse effects undoubtedly would be advantageous if it could be attained without adding materially to first cost, weight or rattling tendencies.

Hard rubber is one material suggested for fenders, but there is considerable question whether it or any other substance with similar properties would fill the bill completely. When fenders for replacement purposes are shipped by the car load to all large cities at frequent intervals it is clear that the present type is lacking in certain desirable qualities.

Demands for finishes which will at the same time be quickly and easily applied and have better lasting qualities than the finish used on most cars (other than those with a high bake enamel finish) has had in the past already appear to have borne fruit, but their use to date is not very extensive. Many concerns are known to be still at work investigating this phase of automobile manufacture and it is quite likely that present methods, especially for cheaper cars, will undergo a radical and quite general change in the next few years. Such a change is a probable outgrowth of the popular demand for cars finished in colors instead of black.

### All-Purpose Cars

There is, at least in certain grades of car, much to be said for an all-purpose body which can be used for transporting either or both passengers and freight of various kinds and which can be converted quickly and easily from one use to the other. Success has attended some efforts in this direction and first efforts generally are capable of much improvement.

Closed cars which are cheaper but still reasonably durable have met an insistent demand and are increasing in favor. This type of body seems likely to make further gains in popularity, especially in the all-purpose form. Its value and consequent ease of sale might be increased still further if inexpensive and satisfactory means for making it more comfortable both in warm and in cold weather can be developed.

Beyond doubt there would be a large demand for a substitute for plate glass if a substance which is cheaper, lighter less friable and still equally clear and comparatively free from rapid deterioration due to scratching, discoloration, etc., were available. This would be true especially if such a substance could be rolled or bent without injury. We are not aware that any efforts are being made to produce such a material, but it seems evident that the result of such efforts, if fruitful, would be worth while.

The important thing to realize is that advancement in automobile construction is not at a standstill nor is it likely to come to an end. Better cars will be easier to sell because they benefit the user. Makers who realize this fact are entitled to benefit by it.



# Pierce-Arrow Added to List of Cars Fitted with Front-Wheel Brakes

Adopts construction in which operating shafts are carried on axle center. Reverse Elliott knuckle has vertical axis which meets ground more than 2 in. from central point of tire contact. Provision against locking front wheels considered unnecessary.

**P**IERCE-ARROW has adopted four-wheel brakes of a design closely resembling that used for some time on various European cars. Front brakes are applied by cams at the extremities of camshafts mounted on the front axle center and connected by rods and bell cranks to the brake pedal, which actuates also the rear pair of brakes.

Each pair of brakes has its own equalizer, but there is no equalizer between the two pairs. Rear brakes can be operated also by hand by means of a connection through which the pull rod slides when the pedal is used alone. The general arrangement is indicated in the accompanying perspective diagram.

It is claimed that the brakes do not interfere in any way with steering, or steering with brakes. No special provision is made to prevent locking of front wheels when they are cramped, as it is felt by Pierce-Arrow engineers that this is not a desirable arrangement. The brake arrangement is such, however, that the braking effort is divided between front and rear wheels in the same ratio as the weight on each pair of wheels, namely 60 per cent rear and 40 per cent front.

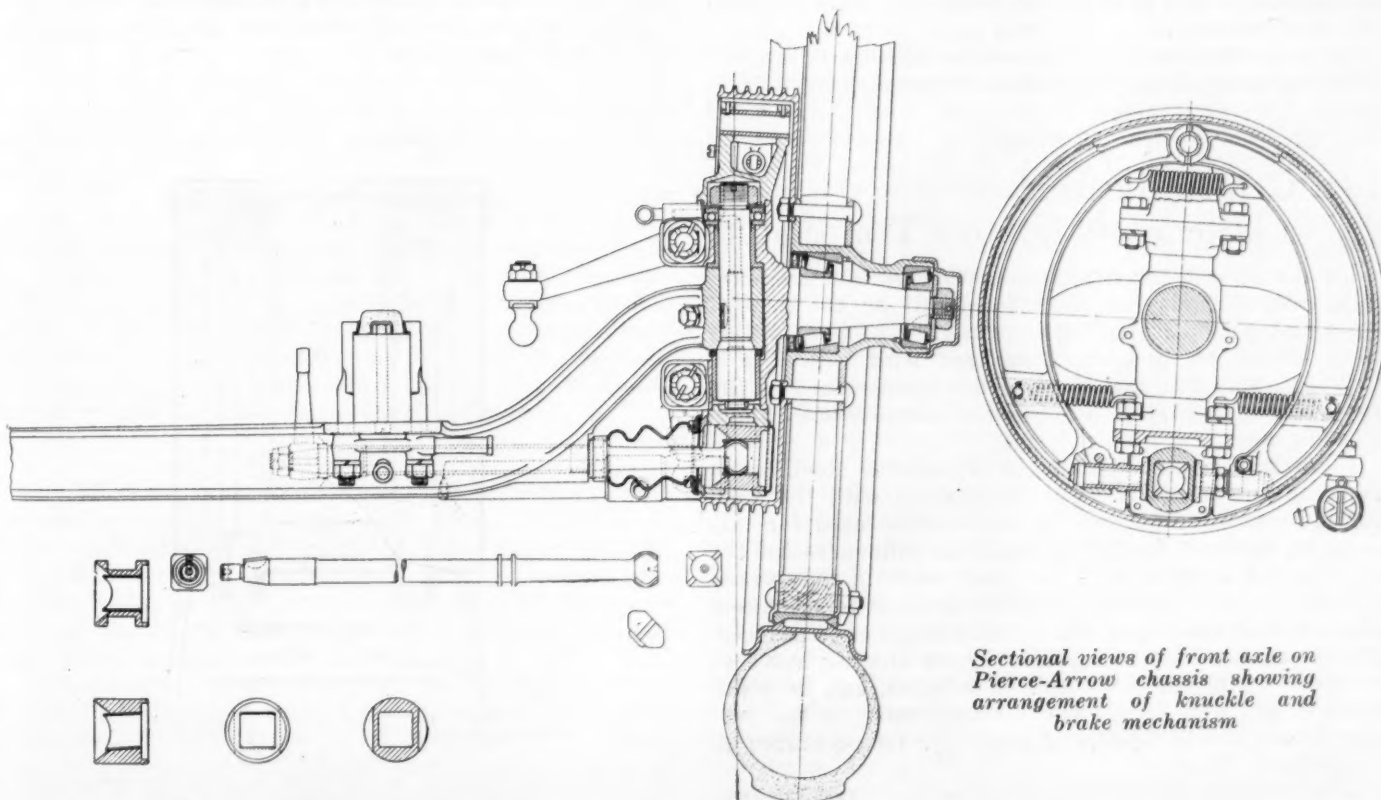
Although the front axle has been redesigned to accommodate the brake operating mechanism, the knuckle pivots are not inclined as in most other designs. Wheels are considerably undergathered but the distance between the central point of tire contact and the point at which the extension of the knuckle pivot axis intersects the ground is approximately  $2\frac{1}{8}$  in.

## Cam and Cam Block Construction

By reference to the accompanying drawing of the axle it will be seen that the cam formed as an integral part of the camshaft is substantially square in end view but is rounded as viewed from the side to enable the knuckle to turn about its pivot without affecting brake operation.

The cam is hardened and fits into a hardened cam block which is milled flat at each side to form a bearing surface for the flat hardened head studs which are screwed into the ends of each brake shoe. These studs provide a means for adjustment of the shoes as the brake linings wear.

The cam block is packed with grease when it is assembled over the cam. A boot is used to close the space around



Sectional views of front axle on  
Pierce-Arrow chassis showing  
arrangement of knuckle and  
brake mechanism

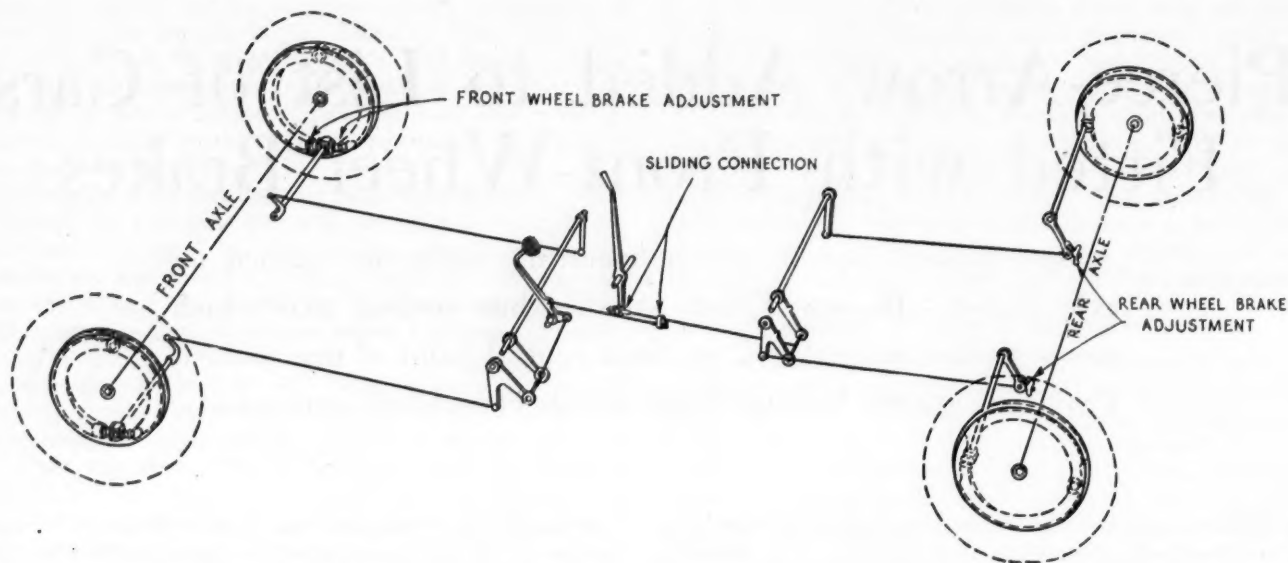


Diagram showing arrangement of brakes and their operating mechanism on Pierce-Arrow chassis

the end of the camshaft and join the brake inclosure to the axle center. The usual connections for lubricating the camshaft bearing in the axle by use of a pressure gun are provided.

Brake shoes are aluminum castings and are hinged to anchorage pins at the top in the case of the front brakes. Front brakes are 14 in. in diameter and  $2\frac{1}{4}$  in. wide and rear brakes  $15\frac{7}{16}$  in. in diameter by  $2\frac{3}{4}$  in. wide. Both sets expand against steel drums with integral cooling ribs.

Front brakes are inclosed by aluminum plates which are easily removed when adjustments are required.

A ball thrust bearing is used at the top of the knuckle pivot. The pivot pin is fixed in the reverse Elliott axle end and is arranged to turn in bronze bushings inserted in the chrome nickel steel knuckle forging. Wheel spindles are fitted with Timken roller bearings. Front springs are somewhat modified to take the torque caused by braking action, and the axle is, of course, designed to have adequate torsional strength.

It is understood that front-wheel brakes will be furnished as optional equipment at an extra charge of \$250.

tests consists of an electric stove with ignition block, as shown in the drawing; a pyrometer, an oxygen supply, a source of electric current and the necessary electric switches and control devices. Most laboratories are in possession of some of this apparatus.

A rough preliminary test is made to find the approximate ignition temperature. In the final test, as the temperature of the ignition block, indicated by the pyrometer, approaches the ignition point found in the preliminary test, while oxygen is being supplied constantly, fuel is allowed to flow into the block drop by drop until ignition is indicated by a very pronounced detonation.

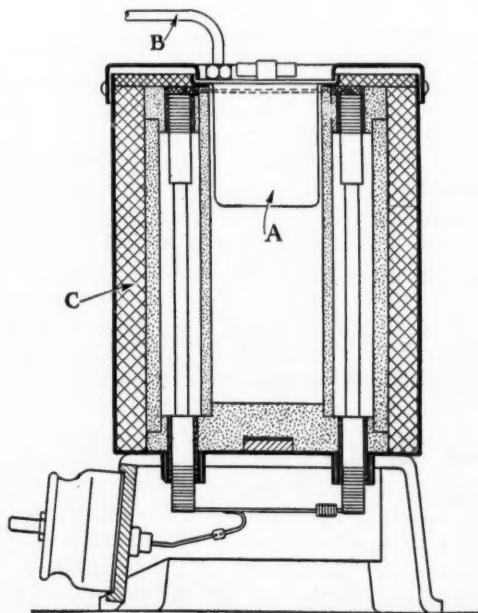
From the momentary temperature of the ignition block and the temperature within the ignition chamber, as determined by a second thermo-element, the ignition temperature can be directly calculated. It is claimed that a very high degree of accuracy is obtained with this instrument, deviations in the results not exceeding 5 deg. Cent. Ignition temperatures of solid fuels can also be determined by this apparatus.

## New German Instrument Determines Ignition Temperature

**A**N instrument for determining the ignition temperature of fuels has been developed by the firm of Friedrich Krupp in Essen, Germany. Krupp manufactures Diesel engines, in connection with which it is very desirable to know the ignition temperature of the fuels, because they determine the compression which must be used.

Ignition takes place in block A of stainless steel, which is bored out conically. This does away with the need for the expensive platinum crucible often used for this purpose, without danger of catalytic influences on the ignition. A simplification has been made in the oxygen supply B. The mass of the ignition block is so chosen that uniform heating of the ignition chamber is assured. The necessary heat is supplied by an electric stove C, which is furnished for different voltages, can be regulated within wide limits, ensures uniformity in the supply of heat and is capable of producing temperatures up to 2550 deg. Fahr.

The complete outfit for making ignition temperature



Sectional view of Krupp electric stove for determining ignition temperature of fuel



# Automotive Industry Best Customer of Steel Producers

Computations of consumption tonnage do not take price factor into account. Parts and accessories also ignored. Stabler metal markets are likely in 1924.

By William Crawford Hirsch

**M**ETAL markets in 1923 ran their predestined course toward normalcy with no transitory deflections so grave as to become a serious problem to consumers in the automotive industries. Steel prices, especially, sailed on an even keel—impressively so when contrasted with the dizzying fluctuations ushered in by the 1920 boom and which continued until that bubble had been pricked.

Ups and downs there always have been and always will be and a stationary market is as unhealthy as one in which values rise precipitately one day only to tumble the next. Steel prices recorded in 1923 denoted as nearly a stabilized state of the market as is attainable amid the perfectly natural changes of the ratio of supply to demand. Pig iron, on the other hand, repeated its prince and pauper performance of the preceding two years with this difference, however, that in 1923 automotive foundries were not caught with any \$30 iron on their hands when the market approached the \$20 line. This was a gratifying condition not always in evidence in the pig iron market upheavals of the post-war period.

In the aluminum market the inescapable effect of the Fordney-McCumber tariff made itself fully felt, aside from the mere noticeable diminution of rivalry between producers in all of the world's markets. This development, however, was a foregone conclusion and could bring no fresh disappointments to the automotive industries, which continue to consume steadily increasing tonnages of this metal.

The fact that the copper market was ailing the greater part of the year found its compensation in much broader consumption of copper and brass products in the automotive industries. Storage battery makers were constantly confronted by a very tight fit of demand and supply in the lead market, and had to be on their guard throughout the year so as not to be forced to replenish their supplies of this metal while one of the periodically recurring near-famines was under full headway.

## Sharp Rise in Tin

Tin, still the international metal speculator's favorite, traveled a wide range in its climb toward a level more nearly conforming with commodity values in general. All in all, however, the movement of ferrous as well as non-ferrous metal prices brought to automotive consumers none of the sharp risks which even the most cautious commitment entailed in 1920 and 1921.

With relatively slight exceptions, the character of the buying for automotive account was what in pre-war years would have been referred to as hand-to-mouth. There was no disposition to anticipate steel wants to a greater degree than actual, not tentative, operating schedules made mandatory. The steel industry, however, has become

accustomed to this change in buying methods and contracts for long deferred deliveries of the easily cancellable type, which in former years inflated mills' backlog of orders, are rapidly going out of fashion.

The automotive steel consumer learned his lesson during the aftermath of the 1920 boom when he was chided for taking advantage of what was then a well established practice in the steel market, that of cancelling orders against which no specifications had been entered. The cry that went up about the sanctity of contracts, although custom and the silent assent of sellers had divested them of all binding force save that of an option, did not fall on deaf ears.

## Specifications Accompany Orders

There and then the automotive industries began to make many bites of a cherry when it came to placing steel orders, and consumers of steel in many other lines followed suit. Under present conditions specifications frequently accompany orders. The steel industry is the gainer, because a cherry, no matter how many bites it may be divided into, is better than the "lemons" that many long time contracts of former days turned out to be.

Just how much iron, steel and non-ferrous metals the automotive industries absorb continues to be the theme of frequently heated discussions in metal market circles. Conveniently brushing aside the obvious fact that motor trucks, averaging a much greater weight of steel contents than light passenger motor cars, form an integral part of automotive production, the gentlemen of the old school whose memories fondly harken back to the days when cowbells solved the traffic problem will invariably insist upon taking as their basis for computations of rolled steel consumption in the automotive industries the shipping weight of the light type of passenger cars, concede that two-thirds of this weight is made up of rolled steel products, and on this fallacious premise triumphantly build up the conclusion that "only 7 per cent of the rolled steel produced goes into automobiles."

A curious mental twist is revealed by the fact that in the steel industry, where it is well understood that between theoretical ingot production and actual commercial rolled steel deliveries to consumers there takes place a 25 per cent tonnage shrinkage, due chiefly, of course, to scrap and scale, there still are those who never take into consideration the much greater tonnages of steel purchased by the automotive industries than those actually contained in their finished products, the difference being accounted for by scrap which is just as unavoidable in the fashioning of steel parts to meet automotive requirements as it is in rolling the steel.

A veteran steel statistician recently essayed an analysis as to the comparative steel replacement requirements for

automobiles and railroad passenger and freight cars. He placed the number of passenger and freight railroad cars in the United States at \$2,500,000 and the amount of steel in each at 42,000 to 45,000 pounds. The life of a railroad freight or passenger car he placed at between 21 and 28 years. Comparing this with passenger motor cars and trucks, the number of which he placed at 12,500,000 and to which he gave an average steel content of between 1400 and 1500 pounds and a life of seven years, he reached the conclusion that in the coming years railroad cars would call for twice as much steel by way of replacements as would passenger motor cars and motor trucks.

According to recent United States Department of Commerce statistics, the number of passenger cars and motor trucks in use in the United States exceeds by 1,500,000 the total named in this computation, which might be successfully challenged also on other grounds. There is no need of this, however, for although its object was manifestly to minimize steel consumption in the automotive industries and to magnify that in railroad cars, its effect is the very opposite from what it is intended to be.

### Expensive Steel Required

The bulk of the steel requirements of railroad passenger and freight car builders consist of plates, shapes and bars that, pound for pound, cost less than one-half what finished automobile sheets cost, to say nothing of automotive alloy steels some of which cost three and almost four times what the run of steel entering freight cars cost. Not even the most enthusiastic spokesman for the freight car builders will deny that on the whole the cost of steels used in the automotive industries is, pound for pound, twice that of the steels bought by freight car builders.

So that even accepting at its doubtful face value the foregoing formula for ascertaining comparative steel replacement requirements in the two industries, the conclusion must be reached that steel producers will derive as much, if not more, revenue from the replacement requirements of the automotive industries as from those in sight from the railroad passenger and freight car industry, despite the possibly greater tonnage called for by

**J**UST how much iron, steel and non-ferrous metals the automotive industry absorbs continues to be the theme of heated discussions in metal market circles.

The author of this article estimates on a conservative basis that the steel producers will derive as much, if not more, revenue from the replacement requirements of the automotive industry as from those in sight from the railroad passenger car and freight industry.

the latter. There is very little doubt as to the reply a steel producer would give to the question whether his industry's prosperity depends upon the number of tons of iron it converts into steel or upon the value it adds to the iron by steel mill processes.

To some extent, however, the automotive industries have only themselves to blame for the haze that continues to surround the extent of their steel consumption. In the "Pittsburgh Plus" investigation passenger motor car manufacturers submitted to the Federal Trade Commission data covering their individual steel purchases during the five-year period of 1918-1922.

These returns disclosed a wide disagreement among automotive steel consumers as to what certain designations of steel mean and still wider disagreement with the ordinary nomenclature in vogue in the steel industry. One of the largest factors in passenger motor car production reported using a considerable tonnage of "shapes" when the steel industry's understanding is that in passenger motor car construction there is used a negligible tonnage in the way of "shapes," by which term are designated generally such heavy products as I-beams, splice bars, channels, zeos, tees, angles, etc., more or less irregular sections reduced from blooms, slabs or billets and all foreign to the automobile.

### Individual Needs Vary

Then, again, returns made to the Federal Trade Commission showed that one manufacturer of passenger cars used 4 times as many alloy bars per car as another maker in about the same class and with about the same selling price. Their reports also disclosed a divergence of 50 per cent in the weight of "automobile" sheets used per car, and while one stated that 12.4 per cent of his steel consumption consisted of wire products, the other placed his use of wire products at a paltry 1/10 per cent of the steel he consumed. The latter manufacturer, on the other hand, reported that somewhat more than 5 per cent of the steel he put into each car consisted of strip steel of which designation the other manufacturer said he used none at all, but he did report using 10 per cent bands, strips and hoops.

Obviously there is need of a common language before it will be possible to state how much of each of the leading steel products is used in the motor car industry. Carbon bars, as the term is ordinarily used in the steel industry, are the ordinary product of merchant mills which one associates with the lowest base price for rolled steel products. In the automotive industries much of the carbon bar consumption consists, however, of special steels, representing a considerable enhancement in price over that of the ordinary plain bars. Cold-finishing adds 20 per cent to costs. Division merely into carbon and alloy bars, such as shown in the returns to the Federal Trade Commission referred to, fails to emphasize adequately the importance of special steels not coming properly under the head of alloy steels, and yet involving an important increase over common carbon bars in the automotive industries' steel bill.

### All Purchases Not Listed

Secondary steel products, such as bolts and nuts, of which motor car and truck manufacturers buy large quantities, were apparently not included in the reports to the Federal Trade Commission. In fact, in all such computations which are invariably used to demonstrate how light the tonnage of steel consumed in the automotive industries is, numbers of secondary steel products are constantly overlooked. One need but think of steel chain, of which at least half goes into tire chains. This is a small item, but it absorbs approximately 50,000 tons of steel a year.

Automotive products other than the annual output of new passenger cars, trucks and tractors, such as supplemental equipment and replacement parts, as well as mechanical refinements, furnish still more of a problem in point of the steel tonnages which they absorb. Deceptive as the weight of a passenger car is as a basis for figuring the steel tonnage required to build it, it imposes at least some restriction upon the microscopic guesses of those who constantly seek to belittle the automotive industries' importance as a steel consumer.

When it comes to replacement parts and what are



commonly referred to as accessories, dependable data are so conspicuous by their absence that it is impossible to gainsay those who simply ignore the undoubtedly important tonnages of steel and other metals consumed in the manufacture of these specialties. When Henry Ford asks for bids on 25,000 tons of structural steel for a new assembling plant, the building industry is given the statistical benefit. When he buys a million dollars' worth of machine tools, the machinery industry is credited with it.

Recent market developments have impressively shown what a great advantage it would be to the automotive industries if authoritative figures as to the size of their annual steel bill were available. That consuming industry which is possessed of the greatest buying power always fares best in any market. For the automotive industries as a whole, nailing down of the fact by irrefutable figures that it is the steel producers' best customer, would be much the same as an AAA 1 rating in Dun's or Bradstreet's is to the individual. It is known that the automotive industries constitute the most important buying class in the sheet and alloy steel markets and it is sensed that the automotive industries wielded in 1923 a greater influence on the steel industry's profit and loss account than any other steel consuming industry, but if this were clinched by actual figures in dollars and cents, the statistics would exert a powerful influence.

#### Definite Data Might Be Collected

It would seem to be a relatively easy matter for the individual members of the trade associations in the various branches of the automotive industry to furnish confidential information as to the size of their annual steel bills. Classifications of the kinds of steel products consumed should be simple and serviceable. Attempts have been made to collect the necessary facts from the steel producers, but with those willing to collaborate in such an effort tonnage is the sole criterion, and here the issue to be determined conclusively is not one of tonnage but of value.

With the imperfect tools available for measuring automotive consumption of steel, the best makeshift is to calculate it on the basis of what the steel producers conceded to have been the 1922 record, i. e., 2,500,000 tons. Proportionate to the 50 per cent increase in 1923 motor car and truck production over that of 1922, the steel industry might be expected to concede to the automotive industries a 3,750,000-ton steel consumption in 1923, but as this would constitute approximately 12 per cent of the probable total rolled steel production, it is quite likely to be revised downward on the plea that the proportion of light-car output in 1923 was greater than in 1922. It is safe to assume, however, that adding to the tonnage of steel consumed in new passenger cars and trucks, tractors, etc., that absorbed in replacement parts and supplementary equipment, the automotive industries consumed in 1923 from 4,250,000 to 4,500,000 tons of steel products.

#### Bright Prospects at Beginning of Year

A concise review of the year's market history is necessary to facilitate discussion of the outlook for 1924.

Conditions at the year's opening were decidedly propitious from the steel producer's point of view. The chief interest at the outset of the year had enough sheet orders on its books to carry it through the first quarter, and before January had given way to February its backlog of sheet orders sufficed to absorb the first half year's prospective output. Independents were in a cor-

respondingly comfortable position, keeping their second quarter order books as free as possible in anticipation of a \$3 per ton advance in sheet prices.

In some of the steel products, advances took place in January, but only after the bulk of the business for the current quarter had been placed. The price of steel bars rose about \$3 a ton in February, and late that month the American Sheet & Tin Plate Co. announced advances of \$3 to \$6 a ton. Its price for full-finished automobile sheets until then had been 4.70 cents, while independents had been getting 5 cents, and in some instances pre-

**A**UTOMOTIVE consumption of copper and brass products in 1923 reached approximately 200,000,000 lb. The copper market held up well in the beginning of the year.

Prices climbed until the middle of March, but the advance came to a sudden halt in April. Since that time the market has dropped and present levels are about the same as they were a year ago.

miums over that level were paid. In bringing its price up to 5 cents, the American Sheet & Tin Plate Co. simply sought to escape the annoyance of having to turn down orders, being at that time booked up to its capacity for at least three to four months.

March brought memories of the 1920 inflation. Sheet bars, which started quiet enough in January, although at a somewhat higher level than at the close of 1922, rose in March from \$38.50 to \$45, and in some instances to \$50, with most producers unwilling to sell at any price. Delivery premiums on sheets became common. Bars underwent further enhancement in value. Late in April the American Sheet & Tin Plate Co. opened its third quarter books at prices \$7 per ton higher than its February schedule, bringing the price for full-finished automobile sheets to 5.35 cents.

#### Delivery Premiums Discontinued

The popularity of delivery premiums began to wane, and by June they had vanished, but in spite of a marked falling off in demand, base prices were held intact. When the American Sheet & Tin Plate Co. opened its order books for the year's last quarter, it did so at unchanged prices, with about a month's tonnage on its unfilled order books. Smaller producers had even a lighter reserve of orders. Although prices on the whole were maintained throughout the year's remainder at or very close to the price levels marked up in April, the tone of the market underwent repeated changes.

By June it had become apparent that no buying movement which would sustain further enhancement of finished steel prices could be hoped for and non-integrated sheet rollers were once more able to cover their sheet bar requirements at \$42.50. Time and again during the eight months in which finished steel quotations remained unaltered, it seemed that sharp declines were just around the corner. Invariably, however, the precept of the large market factors who saw no possibility of quickening demand by cutting prices, together with high costs of production which could not be budged, stiffened the backbone of the weak-kneed so that at the critical moment they would turn down lower bids, urgent as their need of the business might have been.

In point of steel output, 1923, with an estimated ingot production of 43,000,000 tons, is comparable with 1917, when 43,619,200 tons were recorded. In point of the price movement, 1923 was the very antithesis of 1917. In the latter year prices in the finished steel market fluctuated so sharply that at one time black sheets were in abundant supply at 4½ cents, while six months later they were difficult to obtain at 9 cents, and at the end of the year they were again down to 5 cents. In 1923 the high was 4 and the low 3.35 cents, denoting the relatively narrow range of price fluctuations, one of last year's outstanding characteristics.

### Pig Iron Is Active

If the steel market was impressively tame in its ups and downs, the pig iron market again exhibited its pyrotechnical propensities, foundry iron, valley, selling at \$31 in the last week of March and at below \$22 in November. The high prices of the first five months of the year were in a way a legacy of the 1922 coal strike, but the high levels caused by that untoward event had in part been liquidated during the last quarter of 1922. Resumption of an upward trend during the first quarter of 1923 was not a sound development and liquidation, prematurely ended in January, became all the more pronounced toward the close of the year. The pig iron market is having a difficult time ridding itself of the violent price swings to which it became addicted in the war and post-armistice boom. This wide disparity of prices in the same year is unnatural and not the pig iron market's normal condition. A gap of \$2 to \$3 a ton was looked upon as a very wide movement in pre-war years. Production in 1923 broke all records, totaling in round figures 40,000,000 tons, an increase of virtually 50 per cent over the preceding year's output.

The general aversion of the automotive industries to anticipating raw material requirements too long in advance saved automotive foundries from being obligated to receive high-priced iron to any extent after the market had receded sharply. On the other hand, notice by the largest manufacturer of low-priced passenger motor cars to parts makers in October to curtail output acted as a restraint upon buying by many foundries just when the pig iron market turned into a bargain counter.

### Sharp Change in Aluminum

Outwardly there was no indication at the beginning of the year that the aluminum situation would undergo so sharp a change as it did in 1923. Everyone knew, of course, that the high rates of duty provided in the then new tariff law had not been put there to encourage the importation of foreign metal, but with good-sized shipments of Norwegian ingots, bought in 1922 at 16 to 16½ cents, arriving early in 1923, and Switzerland and other European countries sending over about 1200 tons in January, many thought that the excess of domestic consumption over domestic production, which in the first month of the year amounted to upward of 20 per cent, would continue to be supplied by foreign importations.

January quotations ranged between 22½ and 23 cents. About the middle of February it was stated that the American producer had advanced his price by 1 to 1½ cents. Importers reported sales at 24 to 25 cents, later asking 26 cents and reluctant to accept orders for shipment before July. At the end of the first quarter the American producer was known to be in arrears with deliveries and importers had nothing to offer. Lessening of automotive buying in July caused diminished demand but no recession in prices.

About the middle of November it was stated that the

domestic producer had advanced prices 1 cent, making the increase in the cost of aluminum since the passage of the tariff 7 cents on ingots and 4 cents on sheets. All sorts of reports were current as to the price levels at which automotive consumers had placed their 1924 contracts. Some, it was said, obtained a 25 cent per pound, delivered, rate on 98 to 99 per cent virgin ingots. Others were reported to have paid 26 cents. The domestic producer is obviously following his old-time practice of choosing customers and protecting the chosen ones in price and deliveries. At the same time his program aims at broadening sales of finished products and confining ingot sales to regular consuming customers.

There is no question that the aluminum manufacturers of the world feel considerably more friendly toward one another than they did two years ago. One large Norwegian producer announced in March his withdrawal from the open market and it was generally understood that this plant had passed under American control. Another Norwegian plant was taken over by the largest British producer. Germany and France are no longer factors in the American market. In the matter of price, British and Swiss producers compete no more so with the domestic producer than do the Italians who shipped a small lot of 9-lb. bars to the United States early in the year and then were no more heard from.

### Consumption of Copper and Brass Large

Automotive consumption of copper and brass products in 1923 reached approximately 200,000,000 lb. In the second quarter of the year, consumption of 58,000,000 lb. was credited to the automotive industries. The copper market started the year blithely enough, the electrolytic quotation averaging 14 2/3 cents in January. Prices climbed, until early in March 17 cents was chalked up, and everyone thought copper had definitely turned the corner, but the advance came to a sudden halt in April and from then on the market began to droop. In October it was possible to buy at 12½ cents.

Midsummer brought realization of the much greater production of the red metal than consumption. Europe could not buy enough copper to make an appreciable dent in the surplus that piled up during the third quarter. Although the Copper Export Association's surplus holdings were liquidated by June, the end of the year finds the world's copper stocks at virtually the same levels as a year ago.

Brass mills enjoyed considerable prosperity during the year's first quarter, operating night shifts throughout February, and much of their business came from the automotive industries. Price changes by the leading interest conformed closely to the ups and downs of the metal market. On the last day of September, however, a reduction in extras was promulgated, independent of the course of ingot metal. War scrap has been completely worked up.

### Fluctuations in Tin

Starting the year at 39 cents, Straits tin showed a rising tendency, until by the middle of March the high of 51½ cents was reached. From then on recession set in, frequently interrupted by wild speculation in London and Singapore, which was chiefly responsible for the market's behavior in December, when it again seemed at times headed for the 50-cents level. In April the parties to the so-called Bandoeng agreement, by which the colonial governments of the Eastern tin-producing States prevented forced liquidation following the collapse of war prices, agreed to dispose gradually of the 17,500 tons they were then holding, spreading liquidation over 20 months and permitting the 5 per cent monthly



ratio to be withheld from the market whenever it might turn unpropitious. Deliveries of tin to the United States in 1923 were the heaviest on record, approximating 70,000 tons. The supply has been diminished.

Those in command of the market for lead were between the devil and the deep sea during a large part of the year. In the early months they had to ward off foreign competition by lowering prices sufficiently to make importations unprofitable. At other times they faced diminishing domestic supplies and to conserve them were compelled to raise prices. The leading interest's price at the year's outset was 7¼ cents, New York. By March this had been advanced to 8¼ cents, the year's high. The decline that followed was checked in July, and from then on successive advances brought the price gradually back to the year's opening figure, 7¼ cents, at which the market ruled strong in mid-December. Storage battery makers absorbed record-breaking tonnages in 1923. The largest independent producer fortified his position further by acquiring large competing properties. Actual scarcity caused still further advances during the year's last fortnight.

### **Zinc Market Improves**

The price range for zinc was between 5.75 cents, East St. Louis basis, in June, and 8 cents in March, the market for the most part being a narrow affair, which improved whenever European buying came into sight and reacted upon its withdrawal, producers supporting prices to such an extent, however, that the acute declines of former years were averted in dull periods.

Demand for automotive nickel steels was to a large extent responsible for what little brightness there was in the nickel market in 1923. Quite a few nickel consumers had covered their 1923 requirements in the closing months of the previous year at 25 to 29 cents. As high as 32 cents was paid for prompt shipment toward the first quarter's close. War surplus of nickel has been absorbed and the world's refining capacity is slightly below its normal consumption, which is 2000 tons. In September it was reported that some consumers had initiated negotiations for their 1924 requirements, current quotations then being 27 to 30 cents.

### **Good Year in View**

So much for 1923, but what of 1924? In his review of the 1922 metal markets, published in *AUTOMOTIVE INDUSTRIES* on Jan. 4, 1923, the writer said, with reference to the steel market outlook:

"There are bound to be price fluctuations in 1923, as there have been in every year since markets have existed. On the whole, however, the outlook is for considerable stability in the steel market."

Last year's developments have fully vindicated this judgment. A goodly stretch of the road toward normalcy has been traveled. General conditions will exert a much greater influence upon steel prices in 1924 than the mere ratio of the demand to mills' capacity.

We are on the threshold of an election year, but many election years have been good years for the steel industry. It may be said that 1916, one of the best years ever enjoyed by the steel industry, was so favorable because of the European war demand, and that 1920 was a good steel year because of the post-armistice boom. But 1900 was also a good steel year and 1912 was a fair one, and both were in the dim and distant past when the European cataclysm was not even dreamed of.

The chief stumbling block to the further downward adjustment of steel prices is the labor famine. To relieve this condition by more rational immigration laws

without throwing the country's doors open to undesirables, constitutes not merely a political issue but a problem upon the solution of which the course of steel values will depend to an appreciable extent. Early reduction in Federal taxes would, of course, smooth the way toward further price adjustments.

A very important point to be considered in connection with how automotive consumers will fare in the 1924 steel market is the risk involved in concerted buying movements, such as the one witnessed in the sheet market in December. It so happened that demand from other sheet consuming industries at that time was negligible and the automotive industries, which the National Association of Sheet and Tin Plate Manufacturers credits with a consumption of 34½ per cent of their production, were enabled to cover their requirements for the first quarter of the new year at prices reasonable under the circumstances.

When such a buying movement eventuates at a time of even ordinary demand from other steel consuming industries, however, advances can hardly be avoided. A very healthful sign is the determination of automotive consumers to cover their steel requirements at the lowest possible price and not to permit themselves to be influenced by specious arguments as to the slight difference a few dollars more or less per ton of steel makes in the cost of one automobile. All in all, there are no indications at this time of any marked change in the steel market's even trend, but only at the expense of eternal vigilance on the buyer's part can reasonable price levels be maintained.

### **Coal Strike Would Be Calamity**

A more quiet movement in pig iron can be reasonably expected. British, Belgian and French producers would be only too happy at the opportunities another runaway market would throw in their laps. If recrudescent talk of another bituminous coal strike in April should again turn things topsy-turvy, it would be nothing short of a calamity.

The aluminum market is in the keeping of the domestic producer who, in spite of much that has been said, has always pursued a price policy making possible enlarged use of the metal.

Copper must sooner or later sell at a price more in keeping with other commodity values. Producers realize that the best course for them to follow is to produce at capacity by which overhead costs per pound are lowered. Artificial curtailment of output and imposition of a duty on foreign raw copper, both topics of recent agitation, are recognized to be chimerical schemes. Broadened consumption at home and better conditions in Europe are the two factors on which producers must pin their faith.

### **Tin Is Speculative Football**

Tin probably will continue for some time to be the football of speculation. Consumers, therefore, will buy as they must.

Lead, the supply of which has been lessened further by the ending of the Government's silver purchases under the Pittman Act because many silver properties that produced lead as a by-product have suspended, has been remarkably steady considering the untoward conditions of production. Temporary soaring of prices when the supply falls below the demand and dips when it has been relieved, cannot be avoided.

On the whole, the outlook for the automotive consumer of metals is cheering if he will keep his eyes open.

# Resale Price is an Excellent Yardstick of Success in Car Design

Engineer can be of material help in solving used car problem.  
Dealers want accessibility and low replacement cost.  
Vehicles must be built to please owners.

By David Beecroft\*

**T**HERE is a very real relationship between the engineer and the used car. A change of attitude on the part of the engineer cannot solve the used car problem, but it can contribute materially to a solution. The public feels that there is a much closer relationship between the engineer and the used car problem than many of the latter realize. A great many dealers are each year giving closer study to the used car problem and in their minds, too, is growing a consciousness that the engineer can help considerably to better present conditions.

To some engineers at least, the relationship is so important as to mean loss of position, since some car builders have discontinued manufacturing, not because they are incapable of producing, but solely because the used car problem has put them out of business. They could not build up an organization of dealers capable of making a profit. Many more manufacturers are going the same way unless they awaken to the fact that they must produce cars which can be rebuilt at a lower cost than heretofore.

Why cannot the dealers sell used cars at a profit?

First, because the dealer very often discovers that he cannot rebuild used cars as they should be rebuilt and then sell them for what they are really worth. The public lacks confidence, on the other hand, in used cars which are not rebuilt. It has little faith in those which are sold on what is known as the "as is" basis, that is, sold just as purchased from the first user. This "as is" method of selling has proved to be the arch curse of the used car business.

Why have so many dealers sold used cars on this "as is" policy? We shall endeavor to answer this question by presenting extracts from letters received in the last six weeks from many of the best motor car dealers in the country, dealers who have in many cases been in business from the inception of the industry, and who constitute the backbone of successful retail organizations of today.

## Same Troubles Everywhere

The surprising fact disclosed by these letters is that so many dealers doing business in districts where conditions differ and selling new cars that go into distinctly different fields should give very similar reasons for the present trouble. Here is what one says:

"After a used car has been turned over to a dealer, he finds it necessary to thoroughly overhaul it before reselling it, and this should be done if the dealer wishes to maintain a good business reputation.

"In overhauling these cars, we see the engineer's handiwork. If the car has been so designed that the parts are accessible and get-attable, the cost of over-

hauling is minimized. Incidentally, if the parts have been built heavy enough and with a sufficient factor of safety, the necessity of replacing parts is saved and thereby the cost of overhauling is reduced. Both of these points enter into the relationship between the engineer and the used car.

"Further, if the cars are built and designed properly in the beginning, they will have a longer life. Overhaul costs will be less and the used car will bring a higher price.

"Also, as the automotive engineer is the daddy of the new automobile, I believe the used car is at least his step-child, for it is usually treated as such."

## Owner Sets Used Car Prices

This letter shows that there is a very direct relationship between the engineer and the used car, and it is not so favorable a relationship as might be desired. This suggests that to some extent the engineer might profit by the oft-repeated advice to stop designing cars for himself or as he is told to design them by the sales department, and to start designing them for the owner. The sales department may set the price on new cars but the public has been setting the price on used ones, and the price set in many cases has been a direct result of the dictation of the sales department or the work of the engineer who designed the vehicle.

For example, if you design a car which is very costly to overhaul, and that car today has a low resale value, it is at least reasonable to assume that the question of design and high cost of overhaul are factors in determining the low resale value. Perhaps engineers think that the public is not so critical as this statement would indicate. Here's a little evidence from an engineer, a member of the S. A. E. His work is electric service and he has charge of one of the largest electric service organizations in the country, a service embracing nearly every kind of electrical unit and which covers a very considerable portion of the country. This is what he says regarding this question of lack of accessibility in electrical units and the direct result of it on the value of used cars in question:

"The writer's opinion relative to the effect which accessibility of electrical units might have on the second-hand value of an automobile is that in the majority of cases it does not appear that it would have a major effect, although in several installations the second-hand value of the car has been affected, for the reason that the excessive amount of time required to handle the electrical unit has become quite generally known among owners, and undoubtedly has re-

\*Excerpts from paper read before Cleveland Section meeting of S. A. E.



sulted in a reduction in the sale of the new car of that make, as well as in the market value of the car as a second-hand product."

Let us carry this influence of the owner a step further and see what possibility there is for such a situation in different parts of the country. Statistics of motor cars in use show that the number of vehicles in different sized centers of population are distributed as follows:

On farms and in towns and villages of 5000 population or under, 50.2 per cent of the total cars are owned. On farms there are 30.2 per cent of the cars registered in the country.

#### Accessibility Discussed Widely

There is no denying that on farms every farmer knows his neighbor, and the automobile is one of the daily subjects of conversation. The same applies generally to towns of 5000 population or under. So, it is reasonable to assume that one-half of the car owners of the country discuss the question of their motor cars not only generally but perhaps confidentially. It would not be at all surprising if lack of accessibility, the high cost of spares and the high cost of repairs have been much greater influences in the value of the used cars than is generally supposed.

A recent statement from a motor car dealer, who has spent upward of 25 years in the sale of cars, lends emphasis to this conclusion. This dealer is located in one of the first four cities of the country and for 15 years has taken an active interest in the used car problem. Only last week he said:

"One of the great difficulties with the used car in the large cities is that great numbers of them are shipped into the urban center from small rural communities. The buyer usually is a person known as a gyp dealer in the city. His customary practice is to undersell the city dealer to the extent of \$100 or \$150, which proves not only a thorn in the flesh but a very damaging business factor.

"The country dealer apparently has encountered considerable resistance in selling these used cars to the buyer in his home community and it is highly probable that lack of accessibility or cost of repairs have been factors in reaching this decision."

A statement from another large dealer, who has been selling a high-priced automobile for the past 20 years, is deserving of attention. He says:

"There is no question but that lack of accessibility has been a serious handicap in the sale of our used cars. We have found that it is very difficult to sell a thoroughly rebuilt car and make money on the resale, because the rebuilding cost is so high, due to its design or lack of design, and also due to the cost of spares.

"It is not good business for us to sell these second-hand cars in 'as is' condition, but we are too often compelled to do so for reasons stated."

There is little ground upon which to dispute the desirability of rebuilding the second-hand car before selling it, rather than disposing of it "as is." This is true even when the low-priced cars are considered. In not a few instances selling cars "as is" may have seemed a good policy, however, because of the cost of spares and repair work. A very successful and reliable dealer selling large production cars in a big city has the following comment to make:

"The used car, reconditioned and repainted, even in the under \$1,000 field, finds a ready sale at a more substantial price, which thus helps to standardize car values."

"The engineer's relations to the used car problem plays a very strong part, as beyond a question of doubt a used car has considerably more value when its mechanical condition is good.

"Another point where the engineer plays a part is in the supplying of mechanical units so that their replacement will be comparatively easy when a car is being reconditioned for resale."

An investigation of many owners who have purchased used cars leads to only one conclusion, namely, that the lack of confidence in the used car which is put on the market in "as is" condition is a very serious obstacle to ready sales. These owners are fully aware of the high cost of spares, the high cost of labor, the uncertainty of labor, the cost due to lack of accessibility, and it is not surprising that it is sometimes difficult even to give away a used car that has not been reconditioned.

On the other hand, records show that where the owner has confidence in the dealer and confidence in the reconditioning work he does, used cars have been sold at a reasonable profit.

Dealers are taking a broad-minded view of the used car problem, and have no thought of endeavoring to shift all the responsibility to the engineer, as evidenced by the following comment from a dealer handling a car listing at under \$1,000:

"I do not believe that the designing or engineering of a motor car will entirely eliminate the used car burden from the trade, due to the fact that many people like to change cars every year or so, even though their present car may be running well."

Here is a statement from a large dealer selling one of the largest production high-priced cars. He ties up the engineer's responsibility very closely to the resale problem:

"To us the used car problem is an important part of the business. It is the clinker in the furnace which we must remove and clear out continuously in order to create the proper results. Only constant hard work and a sincere desire to build the car and give value for the money will settle the problem."

There is no question but that the sellings of cars two and three times after the original sale is going to continue, provided that we have dealers to make these sales. With 12,000,000 cars in use, there is certain to be a very big percentage of new cars sold to the people now owning cars. If an engineer so designed a vehicle that it would render the kind of service and performance which the public demands, and at the same time simplified it so as to insure a reasonable maintenance expense after years of service, that car necessarily would find a market long after the demand for a poorer engineer job has ceased to exist.

#### Engineering Is Tested by Service

The work of an engineer is on test more in the sale of a used car than in the sale of a new car. The older the car becomes, the more does its owner become conscious of its merits or demerits. All new cars operate well, particularly during the 90-day clause covered by the manufacturer's warranty.

The owner is always proud of his new car. He considers it an evidence of his good judgment, and for the first few months he is constantly telling his friends of the good purchase he made. The car is very personal to him.

But the situation begins to change just as soon as the first repairs have to be made, and he gets his first impression of the design engineer from the amount of his repair bills. Just at that moment the used car problem begins.

The car owner is not going to sell the car after using it a year or so except at a figure that will not be too much of a reflection on his good business judgment. He thought he made a good business transaction when he bought the car, and now if he has been disappointed he is going to be slow to let the world know it. He is going to do everything he can to make a good sale to satisfy himself.

Consequently, he sets out to make the best possible bargain, fully conscious of the fact that he does not have to sell the vehicle but can make certain repairs. Then he meets the new car salesman, who he knows must sell cars and he is in a position to pit one against the other in the transaction.

This experience of the owner lends emphasis to the fact that the good work of the engineer is measured by the years of service in the vehicle. The older the car becomes, the more apparent and conspicuous becomes the work of the engineer. The owner buys a new car perhaps

on appearance and general reputation, but he generally sells because of defects which have already made their appearance or are in the offing. It is the nightmare of costly repairs, the lack of accessibility, the high cost of labor, and the high price of spares that lead the owner to sell his car.

The engineer who designs a new car is rather to be pitied. He is too much the center of attraction in his organization. All of the department heads gather around the first model that comes through and say in chorus, "Isn't she a beauty?" The engineer can scarcely be blamed for swelling out with pride, but it might be a more cautious role to ask that encomiums be delayed with the admonition: "Wait till she gets in the used car market, and then we'll know whether she's a beauty or not."

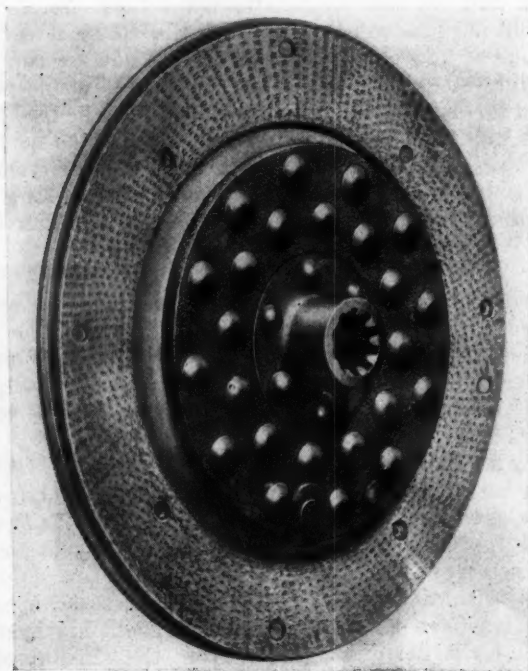
The resale price is the real yard stick of engineering work. That will be the time to pin the badge upon the engineer, or open the door for him.

## Vibration Damper Fitted into Franklin Clutch

**T**HE drive of the Franklin car has been improved by the insertion of a slightly flexible member between the hub and disk of the clutch driven member. Two circular disks of the material commonly used for fabric type universal joints connect the inner to the outer portion of the clutch driven member, being secured to them by riveting.

These disks are more or less flexible and act as a cushion between the engine crankshaft and the gearset, tending to absorb any vibration of the crankshaft before it reaches the gearset. Owing to the manner of building up the clutch driven member, it is likely to be slightly out of balance and, as this is quite undesirable, it is put into both static and dynamic balance by attaching a weight.

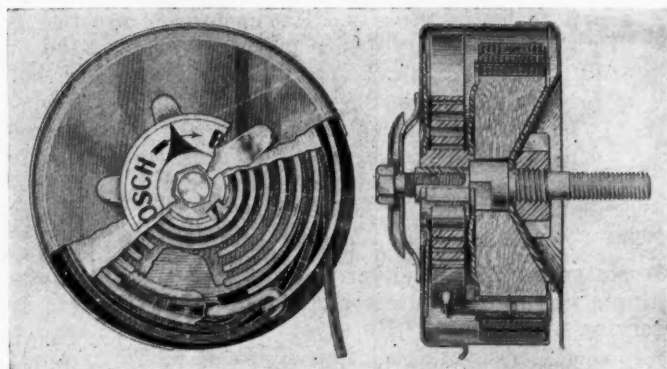
Franklin engineers state that the particular vibration they had to deal with could not be eliminated by means of the Lanchester vibration damper. The Franklin engine represents a somewhat special case in this connection, because the forward end of the crankshaft carries the impeller of the blower, which, of course, has a considerable amount of flywheel capacity.



New flexible member in Franklin clutch

The flexible drive above described was invented by John L. Burns of the Franklin engineering department, and a patent on it has been applied for. It is claimed to entirely obviate torsional vibration so far as the operator is able to detect it, to require no attention in service, and its life is believed to be equal to that of the car.

## American Bosch Company Brings Out Shock Absorber



Sectional views of Bosch shock absorber

**T**HE American Bosch Magneto Corp., which heretofore has confined its activities to electrical equipment, is about to place on the market a variety of non-electrical automobile accessories, and the first new produce announced is a shock absorber of the snubber type. In recent years the firm has built up a large sales and service representation, not only in this country but also abroad.

The new shock absorber checks only the rebound of the springs. It is claimed that a gradually increasing resistance is offered to the rebound, the same as the springs themselves offer to their compression. The device comprises a conical shaped friction drum of the oil-less bearing type, and a belt for connecting the mechanism of the shock absorber to the rear axle.

The cone-shaped, hard wood drum has a large bearing surface and, as all metal-to-metal bearings are eliminated, long life is claimed. A spiral spring keeps the belt taut. The friction of the device can be adjusted by means of a cap screw on the outside of the housing. This shock absorber is made in three sizes, the smallest size being for Fords.



# New Templar Has Four-Wheel Brakes and 6-Cylinder Engine

Reorganized company brings out model with little resemblance to old line. Five-passenger phaeton sells for \$1,895. Power plant is L-head type with 3½ in. bore and 5 in. stroke. Seven bearing crankshaft used. Braking system built by U. S. Axle Co.

A NEW car, incorporating four wheel-brakes, a six cylinder engine with seven main bearings and a four inch longer wheelbase is being manufactured by the new organization controlling the Templar Motor Car Co. Four body types are mounted on the new 122 in. wheelbase chassis, as follows:

- Five-Passenger Phaeton, \$1,895.
- Four-Passenger Suburban Touring Car, \$1,995.
- Four-Passenger, Four-Door Brougham, \$2,459.
- Five-Passenger Sedan, \$2,595.

The body lines have been modified and bear little or no resemblance to those of the previous models. Nickel radiators are now standard on all models, and the former rectangular radiator contour has been supplanted by one having parallel sides and a curved top. The new bodies are larger, but have the same low-hung appearance as the previous ones.

The former four cylinder, over-head valve engine has been replaced by a six-cylinder 3½ x 5 in. engine of L-head construction, with a displacement of 288.6 cu. in. High compression is used, the ratio being 4.35:1. The compressed charge is localized over the valves, only a thin layer extending out over the remote portion of the piston head. The valves are timed as follows:

- Exhaust opens 45 deg. early and closes 8 deg. late.
- Intake opens 8 deg. late and closes 45 deg. late.

The valve lift is 5-16 in. and the firing order is 1-4-2-6-3-5. The power curve shows a maximum output of 69 h.p. at 2400 r.p.m.

Seven main bearings of 2½ in. diameter support the crankshaft, which is first put into static balance and then balanced dynamically after assembly with the flywheel, which also has been balanced statically. The lengths of the main bearings are as follows:

- Front, 2¾ in.
- Center, 2½ in.
- Rear, 2½ in.
- Four intermediate, 1½ in.

## No Shims in Main Bearings

Crank pin bearings are 2 in. in diameter and 1 11-16 in. long. All bearings are bronze-backed, with high-tin bab-bitt linings. No shims are used at the main bearings, but thin steel shims are fitted in the rod bearings. Oil is supplied under high pressure from the gear pump, which is located in the sump and connected to the main bearing caps by copper tube leads, the crank journals and arms being drilled for distribution to the crankpin bearings. Connecting rods are 11 in. long, center to center, the shank being I-section and the upper end bushed for the piston pin, which is ⅞ in. in diameter and of tubular sec-

tion. Four ⅞ in. piston rings are located above the piston pin, which is locked in the medium weight cast iron piston.

The cylinders are cast integral with the crankcase, which later is reinforced by vertical ribs at all cross walls. The water jacket extends down to the bottom of the stroke, and the cylinder barrels as well as the valve seats and ports are entirely surrounded by water. An individual port is provided for each valve, the diameter of the intake being 1 7-16 in. and that of the exhaust somewhat larger. The center line of the intake ports is below that of the exhaust ports, all being located on the right side of the block.

A combined inlet and exhaust manifold, having a common wall for hot spot purposes, is used, the intake portion connecting the ports with the cross passage between cylinders 3 and 4, which connects with the carbureter on the left side of the engine. A special 1 1-4 in. Tillotson plain tube carbureter with accelerating well is used. Preliminary heating is accomplished by a section of flexible hose that connects the carbureter intake with a stove clamped over the exhaust portion of the manifold.

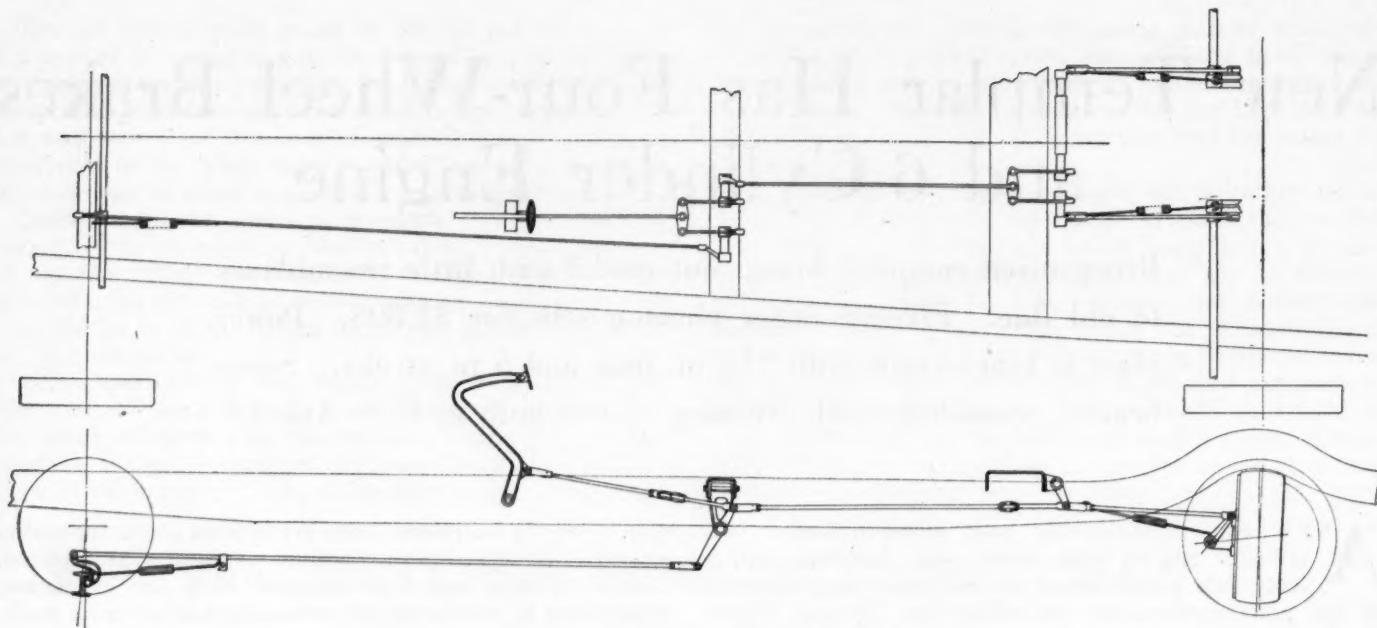
## Valve Operation

Cast iron head valves of 1⅝ in. and 1 25-32 in. clear diameter (for the exhaust and intake respectively) are seated in the top surface of the cylinder block, the stem diameter being 5-16 in. The valves are operated by mushroom tappets having the usual set screw and nut adjustment at the upper ends. Six tappets are assembled in each of two cast iron covers which are bolted and dowelled to a finished surface at the right side of the block. Smaller pressed steel covers which fit on the tappet carriers may be removed for the inspection and adjustment of the valve operating mechanism. The entire carrier may be removed for the inspection of all internal moving parts.

Three pressed-in cast iron bearings support the camshaft, which carries the composition gear of a three-gear train, secured to a flange at the front. Dimensions of the camshaft bearings are as follows:

	Diameter	Length
Front .....	2⅞ in.	2 in.
Center .....	2½ in.	1⅝ in.
Rear .....	1½ in.	1¼ in.

The cams are offset slightly from the centerlines of the tappets and both cams and bearings are hardened and ground. The diameter of the camshaft between bearings is 1¼ in. All gears in the timing train are helical, of 1⅞ in. face. A bronze collar and hardened set screw locate and take the thrust of the camshaft. The crankshaft thrust is taken by the faces of the front main bearing and an adjustable collar is placed behind the timing



*Four-wheel brake system on new Templar car*

pinion, adjustment being made by a nut which is threaded and locked, and the starting jaw sleeve.

Auxiliaries are driven at  $1\frac{1}{2}$  times crankshaft speed and are located at the right side of the block. The Owen-Dyneto electric system is used, and a Connecticut special distributor head is mounted in a small carrier on the back of the timing gear case. Back of this is a flexible coupling and a shaft drive to the water pump, which is bolted to the crankcase. The rear end of the water pump shaft and another flexible coupling drive the generator which is carried in a mounting saddle bolted to the crankcase.

#### Barrel Mounting for Starting Motor

Barrel mounting is used for the starting motor, which extends forward from the upper half of the bell housing at the left side.

A Merchant & Evans dry disk clutch of 10 in. diameter is inclosed in a light flywheel which has a face width of only 1 in., the same as the starting gear. A three-speed Warner gear box is bolted to the back face of the bell housing. Ball bearings carry the upper shafts, which are piloted by a Hyatt roller bearing. Bronze bushings are pressed into the countershaft gear nest, which rotates upon a fixed shaft. Reductions through the change gears are as follows:

First speed.....	3.114:1	Third speed.....	Direct
Second speed.....	1.69 :1	Reverse .....	3.78:1

Taper roller bearings, backed up by adjustable collars, are placed on both sides of the differential gear, being mounted in the differential carrier bolted to the front of the banjo center axle member. Three quarter floating construction is used and two row annular bearings are fitted at the wheels, the axle shafts being taper-fitted into extensions of the wheel hubs. The rear brakes, which are connected to the front brakes by a mechanically equalized linkage, are conventional contracting bands of 16 in. diameter and 2 in. width.

As the band anchor is located at the back of the axle, an approximate half-wrap results. Torque reaction and driving thrust are taken by the rear springs, which are anchored at the front and shackled at the rear. These springs are 2 in. wide and 54 in. long. Impregnated wood bushings are pressed into all spring eyes, and the springs are all made of chrome vanadium alloy.

At the front end a standard U. S. axle with 14 x 2 in. front wheel brakes is fitted, and is connected to the frame by half elliptic 36 x 2 in. springs. Internal shoes are operated by the regular U. S. single shaft and screw and nut equalizer. This construction was described in detail in the June 28, 1923, issue of AUTOMOTIVE INDUSTRIES.

Knuckle pins are inclined at an angle of 9 deg. so that their center lines meet the ground at the approximate center of tread contact. Ball thrust bearings carry the car weight at the knuckles. Particular attention has been paid to the requirements of present day driving and parking, the frame being made narrow at the front and the drag link so arranged that the maximum lock of the front wheels is 40 deg.

The steering gear is of the Ross cam and lever type and carries short lever type spark and throttle controls. A wood rim and an aluminum spider are standard on the open models, while full wood steering wheels are specified for all closed types.

Service brake operation is fully equalized. The pedal lever link is connected to the center of a bar equalizer that divides the braking effort between the front and rear systems. The left side of the equalizer is connected by a long forwardly extending rod to the brake operating lever of the U. S. front axle, where the threads and nuts on the ends of the floating shaft equalize the pressures of the toggle actuated brakes.

#### Rear Brake Operation

Rear brakes are operated by a rod extending backward from the right side of the main equalizer to the center of the rear bar equalizer. From each side of this equalizer rods connect with levers to the inner ends of operating shafts on the rear axle. Particular attention has been given to the location of the rear equalizer shafts, with a view to prevent riding of the brakes when traveling over rough roads.

All body types are finished in paint. The upholstery of the open cars is leather, and of the closed cars, velour. Standard equipment of all models includes a stop light, automatic windshield cleaner, rear vision mirror and drum type headlamps. Vizors are standard on the closed models. Ample leg room is provided in both compartments, the four door brougham being particularly noteworthy in this respect.



# Automotive Industry Should Stimulate Safety Campaigns

Successful work in many cities has provided a sound basis for future efforts in prevention of traffic accidents.

Effects are felt in motor vehicle sales.

By C. W. Price

*Vice-president in charge of Public Safety Division, Elliott Service Co.*

**T**HERE are no patents on the activities which have enabled certain cities to reduce their traffic accidents as much as 50 per cent. Any city can adopt the plans which have been successful elsewhere and vary them to suit local requirements. What is needed, however, is to convince municipal officials, chamber of commerce executives and the heads of all civic agencies and business organizations generally that traffic accidents can be prevented and then to tell them how to do the job.

The automotive industry with its innumerable local representatives, its influence among other industries financially affected by the accident situation, and with its own great resources is in a position to fill this need.

Men who have had occasion to watch the development of industrial safety agree that its success is due primarily to the fact that pioneers in the movement worked out a safety program which is simple, which can be used in any plant and which always gets results. For years it has been possible to go into any plant and say to the general manager: "If you do these five or six things, do them sincerely and consistently, you will reduce accidents in your plant 50 to 75 per cent." And thousands of plants have done just that.

## Simple Program Developed

Men who have been identified with the public safety movement since its beginning have been convinced that the only hope for any real progress lies in the possibility of developing a program of community safety as simple, as flexible, and as sure of results as the industrial safety program. Experiments in this direction have been tried in some two dozen cities. While many of these campaigns were fairly successful it could not, until a year or so ago, truthfully be said that there had been developed a simple, workable plan for a public safety campaign which could be applied to a city of any size with the assurance of results in every case. In the last two years, however, out of the experience of many cities a program has been developed which discards scores of trivial activities which characterized early campaigns and retains only five essential activities which have been found to be of permanent value in every city in which they have been tried.

The most important lesson that has been learned is to utilize in each community certain existing civic agencies and to function them as great pieces of machinery which, when set in motion, are capable of reaching automatically, economically and continuously thousands of persons and impressing them with their personal responsibilities and opportunities for the prevention of accidents.

The public schools constitute one such machine; the newspapers another; the police a third; motor trucks, taxicabs and other commercial vehicles, a fourth. These machines, and a great many others like them, exist in every community. The problem is to utilize them for the purpose of accident prevention without interfering with their normal functions. Not only has this been done successfully in many American cities, but the injection of safety work in the routine activities of these agencies has vitalized and enhanced their ordinary functions.

## Centralized Organization Needed

To utilize the existing machinery for reaching large numbers of people daily it is necessary to establish a safety clearing house or safety service bureau, preferably as a department of some existing organization such as the Chamber of Commerce or the local automobile club. It is inadvisable, in most cases, to create a new organization, for it is the universal sentiment among business men that there are already too many civic, social and business associations.

The activities which had been found to be the determining factors in the success of any community safety campaign have been so refined and standardized as a result of their use in more than twenty cities during the last five years that, given the proper leadership, practically the same results can be achieved in any community.

The automotive industry has supplied such leadership in half a dozen cities during the last year. Representatives of this industry should be among the prime movers of a public safety campaign in every town where such a campaign is started.

## "Safety Week" Is First Step

The experience of practically every city which has undertaken permanent safety campaigns shows that the first essential is a Safety Week Campaign, the effect of which is to attract widespread attention to the permanent campaign and by a striking demonstration in the reduction of accidents during that one week, to convince the people that it is possible to prevent accidents and to convince them so strongly that they say: "Why stop with a Safety Week? Let's have a safety campaign throughout the year."

This is evidenced by the experience of five cities which represent practically every condition found in the United States. These five cities are New York, the metropolis; Washington, the residence city; Pittsburgh, the great industrial center; Louisville and Baltimore, where traffic conditions are typical of a hundred American cities. In each of these places a safety week campaign was

**T**HE automotive industry can do much to stimulate cities throughout the country to undertake thoroughgoing accident prevention work. It probably has an opportunity to contribute more to reduction of traffic accidents on a national scale and in a permanent way than any other single force. But before this industry undertakes active participation in the public safety movement, its leaders must be convinced that it is possible to reduce street accidents. Before they can be convinced they must know exactly how such reductions have been brought about in a number of cities.

This article is the second of a series of three which discusses the relation of the automotive executive to the problems of accidents and traffic. In this article the author outlines briefly the fundamental principles of traffic accident prevention, the methods that have proved successful in cities representing practically every condition of life in America, and the agencies which must be utilized to put those methods into effect.

conducted within the last year with the following results:

ACCIDENTAL DEATHS			
	Safety Week	Corresponding Week of Previous Year	Per Cent Reduction
New York .....	30	70	60
Washington .....	2	6	66
Pittsburgh .....	9	22	60
Baltimore .....	2	9	77
Louisville .....	1	3	66%

These campaigns have demonstrated that more can be done in one week's intensive effort to convince all of the people that accidents can be prevented and to give widespread publicity to the safety movement than can be accomplished in an entire year of ordinary effort. But an accident-prevention campaign which begins and ends with a Safety Week is worse than no campaign at all.

Students of the traffic accident problem and investigators of traffic accident causes are immediately struck by the fact that approximately a third of all automobile accident fatalities are among children. The one underlying reason for this is that the child is largely a creature of impulse; he does not know one minute what he may do the next, nor does the driver in front of whose vehicle he dashes after a ball or playmate. There is only one cure for this situation: That is to build up in the children of today a new set of habits which take into account the changes which have taken place since their parents were children. Toward this end there has been developed a system of safety instruction in public schools which provides for the use of safety material in each of the existing studies.

#### Children Study Safety

To illustrate: at least once a week in the drawing class each child designs a poster on safety. I have seen posters illustrating every kind of hazard, from stealing a ride on the back of a truck to the right and wrong way of crossing a street. In the writing lesson the children copy such sentences as this: "When I start to cross the street, I look to the left, and when I get to the middle of the street, I look to the right." In each school room a safety patrol is appointed to guard the streets when school is dismissed, and to warn the children against crossing the streets when vehicles are approaching.

Through such activities safety is made a vital part of the child's daily life. The incorporation of this plan in its public schools enabled St. Louis to reduce fatal accidents to children from 49 to 18, and Detroit its child fatalities from 96 to 30, in the face of great increases in the number of motor vehicles. It enabled Washington, D. C., in the first nine months following the inauguration of a permanent public safety campaign to reduce its accidents to children 50 per cent.

In the development of public safety the question which has claimed attention more and more is how to visualize safety, how to keep safety continuously and impressively before the people while they are on the streets. Professional public safety men are now agreed that a year-round poster campaign presents the best solution of this problem. The successful safety poster campaign worked out in Washington, D. C., presents the latest example of what it is possible to do toward the prevention of traffic accidents by organizing the community.

At Washington posters are displayed at the more important street intersections, at entrances to schools, gasoline filling stations, garages and public buildings; on the front of street cars and on commercial vehicles. The color, illustration and text of the posters are changed each month.

#### Blame for Accidents Divided

Half of the posters are directed against pedestrians and half against drivers. The very fact that a warning against carelessness is posted on either side of his vehicle tends to make the individual truck driver careful, even though the warning is directed against the other driver or the pedestrian. And when the jaywalker reads a safety message which is posted on a truck he gets not only the message, but a vivid picture of what is likely to happen to him if he disregards it when that particular vehicle is headed his way.

Widely distributed as these posters are over the city, it is not possible for a driver or pedestrian to come down into the heart of the city without being reminded a dozen times of the idea of safety; and he is reminded at the very points where the hazards are greatest.

The driver may read accounts of automobile accidents while he sips his breakfast coffee, and by the time he backs his machine out of the garage he has forgotten them. But if on his way down town he is confronted at every dangerous street intersection with the accusing indictment, "The reckless driver is a criminal," he is compelled to think of safety. In the early part of the Washington campaign a prominent business man said to a friend, "I am a reckless driver; I'll admit it. But those posters on the streets have got me. Every time I face one going down town I slow up."

Except through a general education campaign it is difficult to reach the drivers of private passenger cars with any direct safety training, but it is possible to gather large numbers of drivers of commercial vehicles into a school for group instruction. The drivers of commercial vehicles are, in proportion to their numbers, the largest users of streets, and once interested in accident prevention they are in a position to do more than any other group to reduce the hazards.

During the past four years schools for motor vehicle



drivers, especially drivers of commercial vehicles, have been conducted in a number of large cities, including Washington, Chicago, Detroit, Milwaukee and St. Louis.

Experience in these schools has demonstrated that drivers can be reached and interested in safety just as quickly and quite as effectively as workmen have been reached in industry. Through these classes it has been possible, not only to give drivers information concerning the safe maintenance and operation of their cars, but also a background of information regarding the whole traffic accident problem which impresses them with the fact that any driver who has any sense of duty as a citizen should get back of the safety movement and do his bit to save human life. At the same time these schools have helped to build up the idea that safe driving is a skilled trade. The most important thing that the schools give the driver, however, is an appreciation of the fact that it is easily within his power to save human life every day that he is at the wheel.

In the effort to reach every commercial vehicle driver these cities have found it even more important to place in the hands of every employer of drivers information which will not only convince him of the value of organized safety work but will equip him to instruct personally his drivers and to organize safety on a permanent basis in his own concern.

In an organized community effort for the prevention of traffic accidents the newspapers constitute one of the most direct and effective mediums through which to carry the safety message into the homes. Because of the alarming increase of accidents and the aroused public interest, newspapers in most communities are glad to sponsor campaigns to promote public safety just as they sponsor similar campaigns to combat other evils which menace the life of the community. To secure the intelligent and wholehearted cooperation of the newspapers, however, it is necessary thoroughly to acquaint their editors with the plan of the campaign, even before it has been given to the press for publication and to give the newspapers, not what is ordinarily known as publicity material, but articles and photographs of real educational value.

Not only detailed plans of activities which have been successful in a number of cities, but also the actual materials used are now available for any community. With such plans and materials it is possible for the average American city to conduct a year-round carefully organized public safety campaign for less than the cost of one fatal accident.

## Traffic Service Director Is Appointed for London

AMERICAN cities have no monopoly of traffic congestion and street accident hazards. In many cases foreign streets are narrower and therefore present even greater difficulties. London has recognized the seriousness of the situation by the appointment of a Director of Traffic Services.

Discussing the job which will confront the director, *The Commercial Trader*, one of the leading automotive trade journals of England, says:

The appointment of a Director of Traffic Services for the Metropolis will be welcomed by everyone, and by none more than by those who must come under his controlling hand. Traffic in London has slowed down materially since the war, for the increase has been tremendous. One can hardly realize that it is possible for 56,000

vehicles to pass a single point, even in London, in the course of a 12-hour working day, but a recent census of traffic showed that this actually occurred at Hyde Park Corner, and it gives food for thought to those who live and work in the provinces and who think the traffic problem of their own locality to be acute.

Volume of traffic is one cause of the congestion, mixture of classes of vehicles is a second, the non-use of alternative routes a third, while the occupation of roadway by vans, cycle carriers and even barrows, outside a shop collecting or delivering goods, is a fourth and a very bad one.

### Horse Vehicles Hold Up Traffic

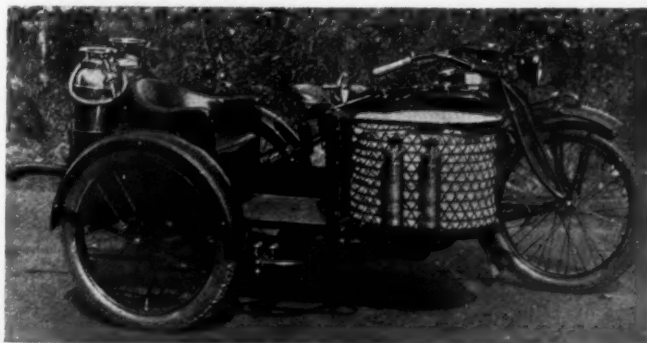
The separation of classes and the discouragement of the horse-driver's habit of keeping from 4 ft. to 8 ft. from the gutter should have been taken in hand years ago. But the police encouraged rather than discouraged the horse-driver, and, today, he takes a delight in holding up what should be the outer and faster line of traffic. He should be very firmly taken in hand by Chief Constable Arthur Bassom, who has been appointed to the new post of director.

Some intelligence should be brought to bear upon the selection of the stopping-places for buses and trams. There has been an attempt in the past two or three years to rearrange them, but some of the "improvements" have been little short of foolish. It is no uncommon experience to find that, in order to make a connection between one service and another, a walk of 100 yd., and even 200 yd., is necessary.

Why alternative roads are not used passes all comprehension.

Congestion caused by waiting vans is a subject that really calls for a firm hand. Commerce must be facilitated, but it should not be possible for a wagon loaded with flour to stand for three-quarters of an hour outside a baker's premises, overlapping one line of tramway and causing delay to the tramcars, which are made to carry out a double shunting operation, and to all the other traffic passing over the busy road junction, where the baker's shop is situated. Yet we have often seen this occur.

We trust that full powers to direct and control the traffic will be asked for and granted, because the experience of London is the experience, although on a smaller scale, of the provincial cities and towns, and the results of carefully devised efforts to facilitate and accelerate traffic in the streets of the Metropolis will be carefully watched all over the country.



Something new in the way of motor fire apparatus. The idea of using a motorcycle for conveying chemical tanks, fire extinguishers and light implements used in fire fighting originated in Richmond in 1920. The Indian Motorcycle Co. worked out numerous refinements to the original conception and the result is shown

# Binary Fluid System Using Mercury Vapor Expected to Cut Power Costs

*General Electric Co. responsible for the development of new method which bids fair to result in more economical utilization of fuel. Efficiency obtained by recovering some of latent heat.*

By P. M. Heldt

**A**UTOMOBILE and parts manufacturers are interested in utilizing fuel more economically in the generation of power from two points of view. In the first place, they are large users of power themselves, so are in a position to benefit directly from any such developments. Secondly, power plants to a certain extent enter into competition with the automobile-using public for the country's supply of liquid fuel; for while the fuel oil burned under boilers and in Diesel engines is not available directly as an automobile fuel, a great deal of it can be converted into such fuel by cracking methods. Hence, any new process which cuts down the amount of fuel required for generating power will relieve the competition for liquid fuels from power stations.

Progress in methods of power production has been turned in a new direction through the development of a binary fluid system making use of mercury vapor. Reports tell of the development of such a system by the General Electric Co., and a paper dealing with the theoretical aspects of the problem was presented at a recent meeting of the Institution of Mechanical Engineers (England).

The use of two working fluids in combination is not new, having been suggested as long ago as 1850. However, in all previously proposed schemes water was the less volatile of the two fluids, being used in conjunction with such highly volatile liquids as ether, carbon bisulphide or sulphur dioxide. In the mercury vapor-steam system water, of course, is the more volatile medium. The reason for the increase in efficiency due to the use of two working fluids of different degrees of volatility may be explained as follows:

## Maximum Efficiency Formula

The maximum efficiency that can be realized in any heat engine is given by the expression

$$\eta = \frac{\text{heat supplied} - \text{heat rejected}}{\text{heat supplied}}$$

With perfect gases, equal supplies of heat produce equal increments of temperature, and in this case the expression for the efficiency may be written

$$\eta = \frac{T_2 - T_1}{T_2}$$

where  $T_1$  and  $T_2$  are the maximum and minimum temperatures of the fluid during the cycle. This shows that the efficiency can be increased by increasing the temperature range of the working fluid.

Now, in steam plants the minimum temperature is limited by the temperature of condensation. This temperature has been lowered by the application of condensers, while the maximum temperature has been raised by using higher working pressures and by superheating the steam, and by these means quite remarkable gains in efficiency have been made.

However, practical limits seem to have been reached in both directions. Modern condensing plants operate with a high degree of vacuum, and little progress is possible in that direction, while the increase of the maximum temperature is tied to an increase in pressure, and there are certain practical difficulties connected with the use of very high working pressures. For one thing, the losses due to leakage in a steam turbine increase with the steam pressure; besides, the blade speed of maximum efficiency goes up with the steam pressure, and even with present pressures this speed is so high as to call for the use of the very best materials to withstand the strains imposed.

## Latent Heat Important

In a general way, the low efficiency of steam power plants is due to the fact that a great deal of heat must be imparted to the water in order to vaporize it, which heat disappears as latent heat and is lost, because the working fluid must be discharged from the power generator while still containing this latent heat.

For instance, to convert one pound of water at 32 deg. Fahr. into saturated steam at 200 lb. pressure requires 1200 British thermal units. Now, if this steam is allowed to expand to atmospheric pressure it still contains 970 B.t.u. of latent heat and after it is condensed it can be made to give off another 180 B.t.u. by cooling it down to 32 deg., from which temperature we started. Therefore, in expanding the steam from 200 lb. per sq. in. down to atmospheric pressure, the loss of heat, which is the equivalent of the maximum amount of mechanical energy that can possibly be obtained from the steam when working non-condensing, is only 50 B.t.u., as compared with the 1200 B.t.u. that must be imparted to the water to turn it into steam at 200 lb. pressure.

This shows clearly that the latent heat is the cause of the relative inefficiency of steam plants and that the efficiency could be greatly improved if some of this latent heat could be recovered. This is exactly what is done in the binary fluid system.

In the mercury vapor-steam system the heat of the fuel is applied to a mercury boiler which is similar in construction to a steam boiler. After leaving the boiler the mercury vapor passes through a superheater and then on to the mercury vapor turbine, which is similar to a steam turbine. From the turbine the vapor passes on to a condenser, and it is in this mercury condenser that the steam is generated. This is possible because the boiling point of mercury under atmospheric pressure is 680 deg. Fahr. In condensing, the mercury gives out its latent heat, and this heat is imparted to the water, which is thereby converted into steam. Of course, in certain steam plants some of the latent heat of the steam is also recovered in feed water heaters, but even if the feed water were heated from 60 to 200 deg. Fahr., this would require only about 15 per cent of the latent heat.



The steam generated in the mercury condenser is passed through a superheater located in the flue over the mercury boiler and is then passed on to the steam turbine. From the latter the exhaust passes to the steam condenser. From this condenser the water is pumped through a water economizer located in the smoke box of the boiler furnace, where it takes up heat from the flue gases, and it then returns to the mercury condenser or steam boiler. There is a similar mercury economizer in the smoke box, between the steam superheater and the water economizer. Thus the hot gases of the furnace act successively on the mercury boiler, the steam superheater, the mercury economizer and the water economizer. By this time a great deal of the heat contained in them has been extracted and they are discharged through the chimney.

#### Difficulties in New Process

As with all engineering developments, there are some difficulties connected with this new process. One depends upon the poisonous nature of the mercury vapor, which makes it necessary to prevent all leaks in the boiler, the turbine, the auxiliary apparatus and the piping. Another relates to the large amount of mercury required with the system and the high cost of this metal. It is stated that at present 7 lb. of mercury is required per kilowatt of capacity, but that it is hoped to reduce this materially. However, from the specific heats and latent heats of mercury and water it can easily be calculated that from seven to eight times as much mercury as water must be used in the system.

It is calculated that with the system as briefly described in the foregoing, a thermal efficiency of about 32 per cent can be obtained, which is about 50 per cent greater than

the thermal efficiency of modern turbo-electric plants of large capacity. Another advantage of the binary fluid system is that the working pressure is very low, and the stresses on all parts carrying the mercury vapor are therefore greatly reduced. It has already been pointed out that mercury boils only at 680 deg. Fahr. at atmospheric pressure, and at 800 deg., which may be the practical limit of the temperature because of difficulties with lubrication, packings, etc., the vapor pressure is only 45 lb. per sq. in. At such low pressure the velocity at which the mercury vapor issues from the turbine nozzles is quite moderate, and as for maximum economy the blade velocity must be a certain proportion of the nozzle velocity, the turbine speed can be reduced and the problem of gearing simplified.

W. L. R. Emmett, the inventor of the system developed by the General Electric Co., is quoted as follows on its features and advantages:

"If the mercury boiler comes up to all expectations, it will produce with 35 lb. gage pressure, when compared with a steam turbine generating plant which uses 200 lb. steam pressure, about 52 per cent more electrical output per pound of fuel. And if in such a plant the boiler room is re-equipped with furnaces and mercury apparatus arranged to burn 18 per cent more fuel, the station capacity with the same steam turbines, condensers, auxiliaries, water circulation would be increased about 80 per cent.

"As regards the danger from mercurial poisoning, either to the community or to the attendants—in the first place, all joints are welded so that it is impossible for mercury to escape except through accident, and arrangements are such that leakage, if it should occur, will go into the stack, where it can do no harm."

## Simplicity and Accuracy Are Combined in New Gear Hobber

THE Brown & Sharpe Mfg. Co. is placing on the market a new addition to its line of hobbing machines. This is a spur gear machine, known as the No. 34 spur gear hobbing machine, and is similar in general construction to the recently announced No. 44 spur and spiral gear hobbing machine.

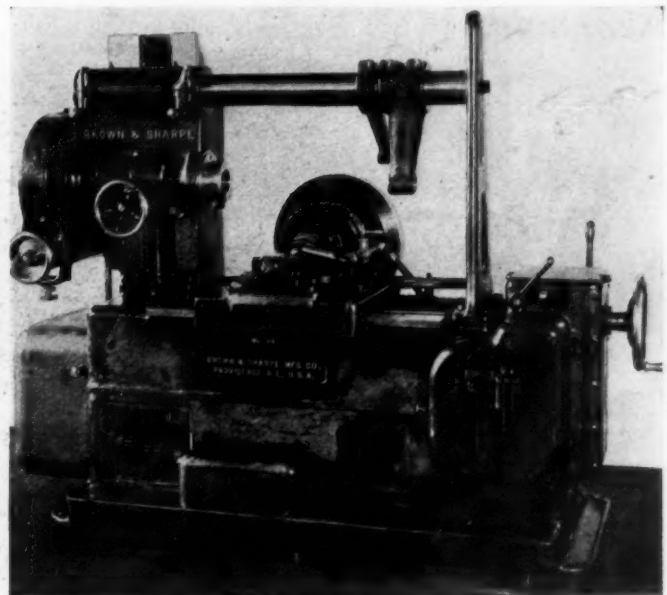
Designed for hobbing spur gears up to 18 in. pitch diameter and 3 diametral pitch in cast iron or 4 in. steel, the machine is characterized by its general massiveness, simplicity and ability to maintain accuracy, together with ease of handling. Precaution has been taken to amply support all gears, and spiral bevel gears are used wherever desirable. This, together with the liberal use of large bearings, is claimed to reduce the wear to a minimum.

The machine is self-contained and can be belted from the main line direct to the single friction pulley, running at the constant speed of 410 r.p.m., thus eliminating a countershaft. This arrangement also readily adapts the machine for motor drive, and when so equipped the motor is geared direct to a friction gear on the main drive shaft. The motor, resting on a bracket at the rear of the machine, is out of the way and yet readily accessible.

The low and compact design of the hob slide and swivel locates the hob spindle close to the ways and insures great rigidity. The heavy overhanging arm and rugged arm brace provide a firm support for the work. Additional support for heavy gears is supplied by an adjustable rim rest placed back of the work being cut, to take the thrust of the hob.

The large balance wheel mounted directly on the hob

spindle steadies the cutting action of both hob and machine and tends to eliminate the chatter so common in hobbing machines. The design of the mechanism is such as to allow the hob slide to be run back and forth when the hob is stationary, thus eliminating laborious hand operation, a feature any operator will appreciate.



Brown & Sharpe No. 34 spur gear hobbing machine

# Inexpensive All-Weather Enclosures Aim of British Car Makers

80 per cent of users there dislike riding under cover. Framed side curtains are much used. Many of these employed as wind screens when top is folded. Weyman fabric leather-covered closed bodies increase in favor, but seem unlikely to displace open type.

By M. W. Bourdon

**I**N England the majority of buyers object to sedans or saloons, as they are called, because they want to be able to have at least a portion of the top collapsible in warm weather. Furthermore, these types are too expensive as a rule for the buyers of small cars who, nevertheless, want a more satisfactory or permanent form of weather protection than the ordinary open car with its top and side curtains affords. If a fixed top is preferred on large cars, the limousine is more often chosen than a sedan because a chauffeur is generally employed and is not always welcome in a one-compartment body.

For several years past there have been attempts to provide a type of body coming between the open car and the "all-weather" in respect of both design and price. The all-weather body, according to British nomenclature, is one having a folding top—usually with a leather covering—with a framing which includes slides for glass windows that can be raised from the double-panelled doors and body sides.

Development hitherto has proceeded along the lines of improving the side curtain equipment of the open car. Considerable ingenuity and not a little additional cost have been expended in this direction. Efforts on these lines have been intensified recently, and many British open cars now have framed and detachable side panelling with celluloid lights which are almost as good as a sedan or an all-weather car in affording protection from the elements,

and with the added advantage—from the standpoint of a very large proportion of British users—that the top can be folded easily and a fully open car secured.

Detachable side panelling, sometimes all of it but invariably the front sections, can remain in position to ward off side winds and reduce back draught, while in many instances the rearmost panels or two of them on each side can be used alternately to form a transverse rear screen, usually with V-shaped front.

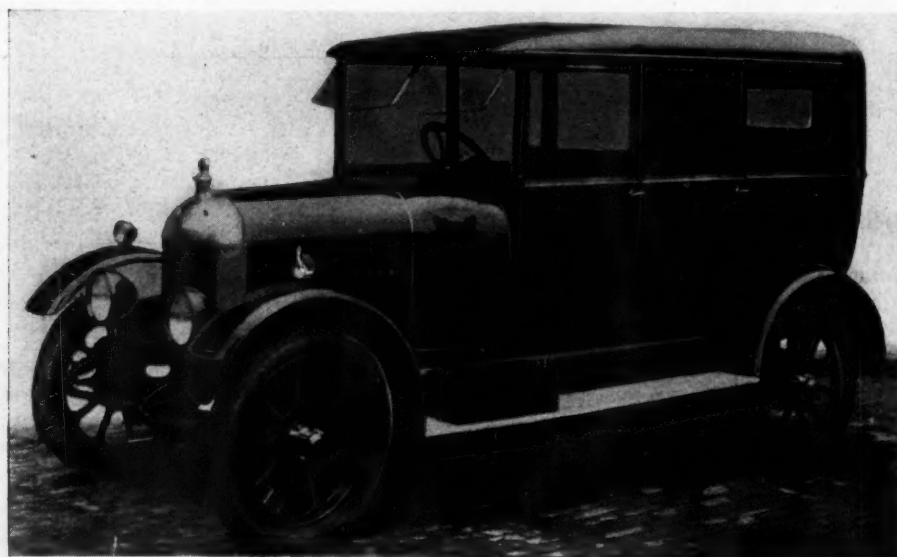
Hitherto a failing of nearly all framed curtain equipments has been the draughts that could enter between the top of the panelling and the valance. In not a few cases that failing practically has been overcome by variations in the framing of the top. In some cases a grooved strip of wood, hinged at the center so as to fold back with the top framing to which it is fixed, is employed. The side panelling is made so that its top edges fit firmly into the grooved cant-rail, while the units of the panelling abut one another closely or have rigid contact with the screen framing. Panels above the doors open with the latter, usually having frame extensions that drop into sockets on the elbow line.

## Convenient Storage Provided

With this improved side curtaining the units must be detachable and means for storing them when out of use must be provided. Celluloid lights are employed in nearly all cases and they become discolored and scratched and are fractured easily. In the British view there is nothing makeshift in the appearance of many of these panels. Some are framed with bright or black metal channels with no fabric attached to them, while others have steel or tubular frames encased in fabric to match the folding top.

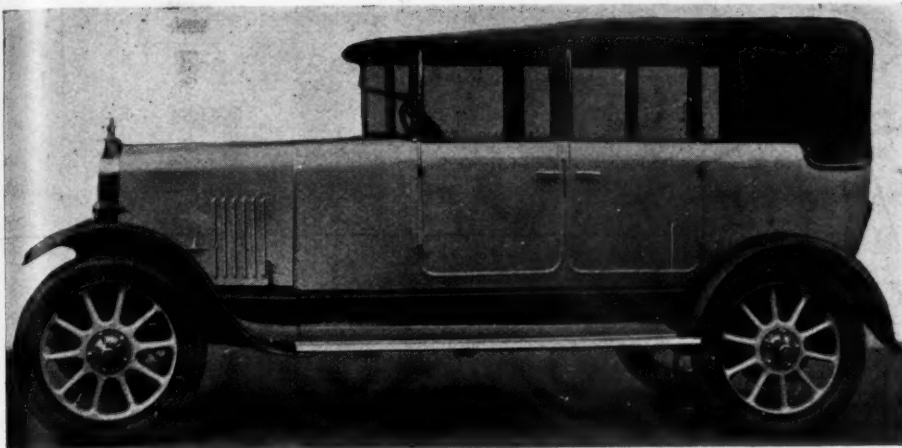
One maker only uses glass instead of celluloid. In this case the panels are hinged to the door tops and are normally concealed against the insides of the doors by reinforced leather flaps. They can be swung up into use and secured without the occupants leaving the car and with very little delay. This scheme cannot be applied where there is paneling of the body between the doors, nor can a light be provided behind the rear door.

A material termed Celastoid and resembling celluloid, but said to be non-



Light "all-weather" four-door body with all-metal head framing and drop windows of material resembling framed celluloid (Vulcan Twelve)





*A British all-metal sedan. Morris Fourteen with Bowden body, with framing entirely of D-section steel tubing to which the panels are secured by screws and welding. Body weighs 450 lb. compared with normal open type with folding top 650 lb.*

inflammable and not subject to discoloration, is used in some cases for curtain lights.

Non-folding fabric tops find little favor in England. Ninety-five per cent of owners who have open cars with fabric tops make good use of the collapsible feature. The remainder lower tops only a few times a year. Some owners keep tops raised all the winter, but there are not a few who raise and lower tops half a dozen times in a day's run if the weather be moderately warm though showery. It is safe to say that 80 per cent of British motorists dislike riding under cover unless compelled to do so by rain or excessive cold.

There are signs that a revision of previously existing conditions will occur as a result of the introduction of the Weyman type of sedan construction. This is likely to become popular for use on light cars of 10 to 14 hp. and has already been adopted by several British car makers and custom body builders. From the light car buyer's standpoint it has three main advantages, viz., low price, low weight and relative freedom from drumming. In some sedan bodies with metal panels and high speed engines drumming at any speeds over 20 m.p.h. has been almost deafening, whereas in the Weyman type it is no more pronounced than in an open car with top and side curtains in use.

It is doubtful, however, whether even the Weyman sedans will encroach very far on the market for open bodies except where otherwise the owners would have kept tops continually erected. It is doubtful if the majority of buyers will waive their preference for an unroofed car on fine days, winter or summer.

No car makers yet have started to make Weyman bodies on a production scale, but have been offering them to find out how the public takes to this form of construction. The following price examples are illuminating:

14 hp. Rover, chassis .....	£375
Four-seated open .....	£495
Weyman sedan .....	£550
Light sedan (panelled)...	£595
Sedan de luxe.....	£695
10 hp. Singer, four-seated open ...	£235
Weyman sedan .....	£275
15 hp. Singer, chassis .....	£360
Four-seated open .....	£500
Weyman sedan .....	£500

It will be seen, therefore, that whereas the prices of the Weyman sedan on the 14 hp. Rover and 10 hp. Singer are respectively £55 and £40 more than the corresponding open cars, with the 15 hp. Singer the prices are identical. It is stated in all cases that the Weyman body weighs less than the corresponding open car; in one case the difference in favor of the former is approximately 100 lb., whereas a normal sedan weighs above 200 lb. more.

In the Singer renderings the rear corners and the roof edges are almost square, whereas in the Rover they are well rounded, the roof being almost dome shaped.

The latter construction is obviously a more costly job in the framing and corner panels. Then, too, the back panel of the Rover is not flat, but has a slight curve, the leatherette being

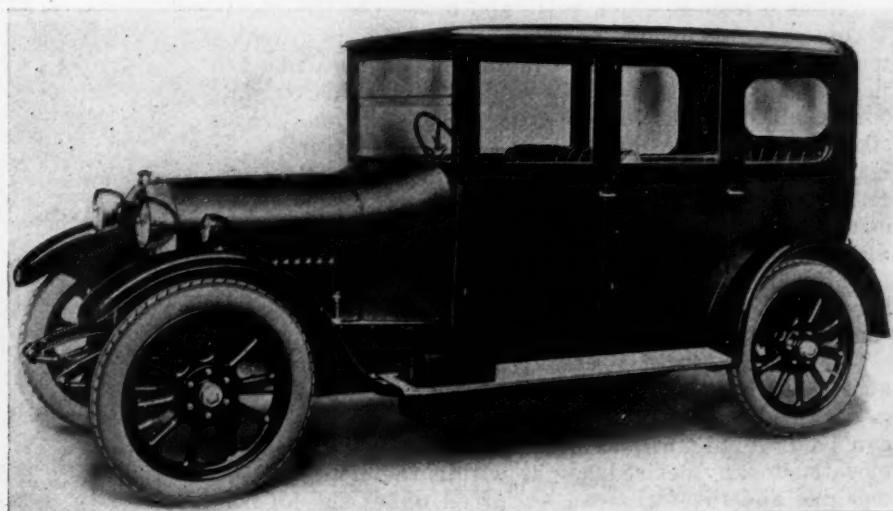
pasted onto millboard; but in the Singer the leatherette is stretched from corner to corner without interior support. In both cases the cowl is a mere framing with the flexible material stretched on but the hoods (bonnets) are different in that the Singer is painted to imitate the leatherette while the Rover has that material coating the metal.

Doors in Weyman jobs extend well below the sill and give a somewhat heavy appearance, especially on small cars. One can hardly assert that the future popularity of the Weyman construction is assured. Durability has been questioned and, although interested parties declare themselves satisfied on that point, it is widely held that the result of normal usage remains to be seen.

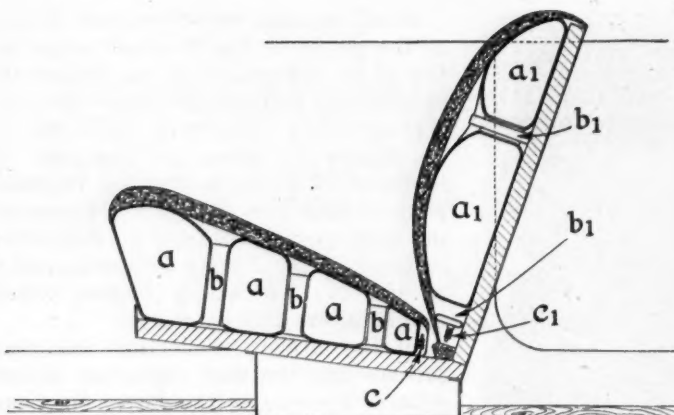
Among detail developments evident in British bodywork for 1924, the most notable is the great increase in the number of standard bodies with front seats adjustable fore and aft. This has long been a feature of a few makers, but the number is approximately doubled this year. One or two makers also arrange for varying the angle of the cushion and make the back adjustable. In the Beardmore the front edge of the cushion board can be raised or lowered about 2 in.

#### New Upholstery Features

Of new features in upholstery, one is the use of two grades of springs, the upper tier more flexible than the



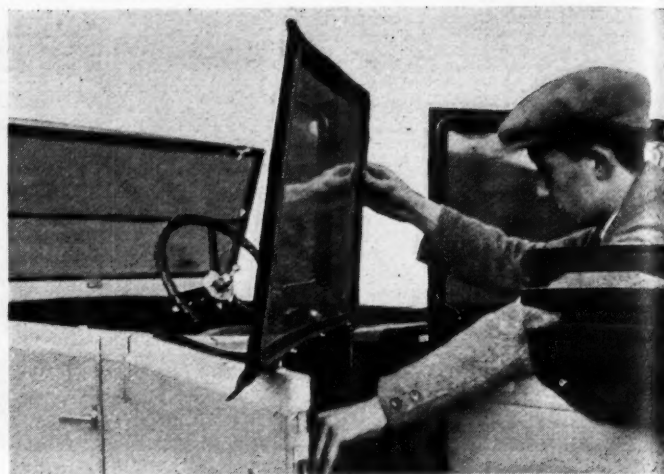
*Weyman type sedan body on 14-hp. Rover. Drop windows in four doors only, fixed panels at rear*



*Pneumatic upholstery on Lagonda light cars. Each passenger's seat has its own air-bags for cushion and back rest. A, A<sub>1</sub>, communicating air spaces with shape-retaining and anti-rolling tubes B, B<sub>1</sub>. Valves for A and A<sub>1</sub> are shown at C and C<sub>1</sub>*

lower. Most Weyman bodies have this arrangement. A pneumatic system has been adopted by a few firms. It is made by a rubber goods company and consists of all-rubber air-bags for cushions and backs, the bags having tubes formed in them (from top to bottom in the case of cushions) open at each end to the atmosphere to prevent central bulging and rolling. A cycle valve is placed in each bag for inflation. Covering consists of fabric and leather between which is a thin layer of hair stuffing. The cost is rather higher than upholstery with springs, but nevertheless has been adopted by Lagonda, a low priced four-passenger light car.

All-metal bodies of pressed steel have not been adopted by British car makers and do not appear likely to be adopted, probably because no individual output justifies the system. The only approach to all-metal bodies consists of sedans made on the Bowden principle (described in *AUTOMOTIVE INDUSTRIES* of Jan. 4, 1923) wherein the framing consists of seamless steel tube of D section to



*Example of framed rear side curtains of open car serving as V-shaped rear screen (Standard Fourteen)*

which the panels are secured by screws and welding; wood strips are used, however, for the window sashes and a few other minor details. The upholstery is detachable and the panelling merely has leatherette or cloth pasted to it to form the interior finish.

Last year the bodies of this type had sliding doors and windows, but hinged doors and drop windows are now fitted. Here again lower weight and price are claimed to render this system especially applicable to sedan bodies for light car chassis, but it has not the advantage of the Weyman bodies in being free from inherent drumming.

Detachable rear upholstery is used on many makes, but merely because the back rest is hinged at the bottom edge to enable the use of a compartment behind it for storing the framed side panels of the folding top. A feature of the Weyman body which is found also on several open cars is the hinged back of the front seat, which permits the rear doorway to be made clear of restriction when passengers are entering.

## New Industrial Trucks Handle Materials from Near Ground

**T**WO new industrial trucks are being marketed by the Automatic Transportation Co. Both are propelled by electric motors driven by energy from storage batteries and both have separate motors for operating the lifting devices which raise and lower the load.

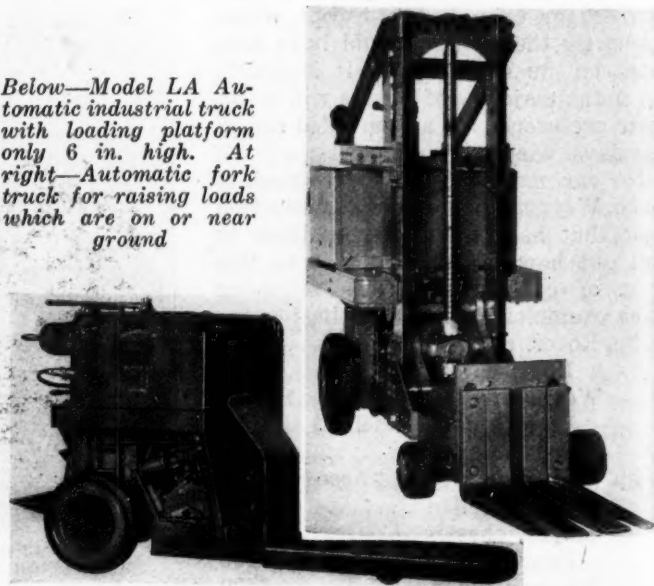
One of these trucks, known as model LA, is provided with a load platform which is only six inches from the floor and is intended for use under truck skids or platforms. It has a lifting capacity of 6,000 lb. and is designed to raise the load 4½ in. Lifting platforms are made in any desired width and length. Under the platform is a 5 in. or 6 in. steel wheel. The entire frame is made from hot riveted structural steel. No castings are employed.

Batteries are said to have ample capacity for operating the truck in and about factories, box cars, etc., a full ten-hour day.

The second truck is similar to the first in some respects but has a quite different lifting mechanism and is designed to pick up its load by means of a fork which can be lowered until it strikes the floor. The load is elevated to any desired height within the limits of the machine and the forks can be forced under the load, it is claimed without outside assistance. With this truck no special platforms or skids are required.

This machine has a lifting capacity of 3,000 to 4,000 lb. and is built in various lifting heights.

*Below—Model LA Automatic industrial truck with loading platform only 6 in. high. At right—Automatic fork truck for raising loads which are on or near ground*





## Gray Adds Three New Models to Present Line

*Wheelbase is 4 in. longer and body designs have been modified on new series. Different style radiator hood used. Brakes and springs changed slightly. Phaeton priced at \$630; sedan, \$875.*

IN addition to its present line of cars, the Gray Motor Corporation is bringing out three new models which are characterized by modified lines, longer wheelbase and several chassis revisions. The new series consists of a touring car which is listed at \$630, a coupe at \$735 and a five passenger sedan at \$875. These prices include the following equipment: cord tires, demountable rims, dash light, gasoline gage, nicked radiator and hardware and disc wheels on the sedan, wood wheels being optional.

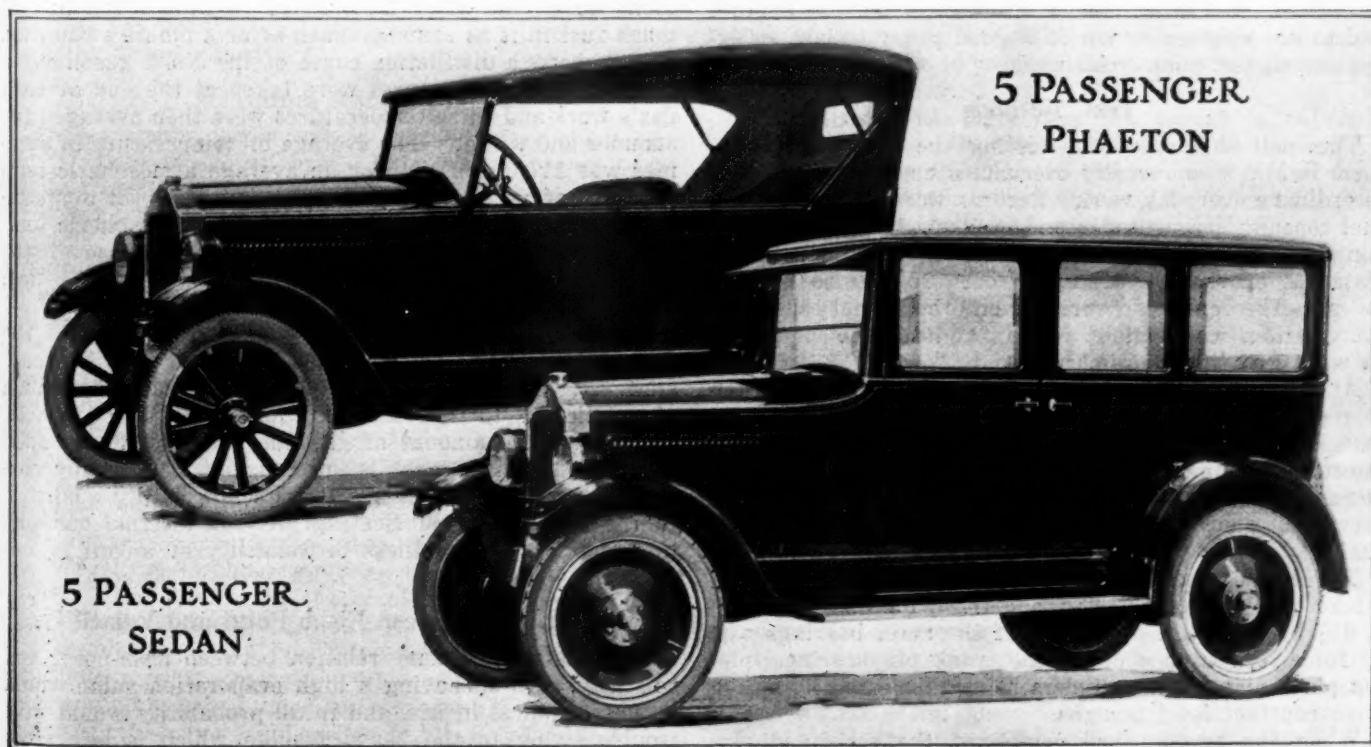
With the addition of 4 in., the wheelbase is now 104 in. This additional length has made possible greater leg room in all three of the new bodies. The gasoline tank has been removed from under the cowl and is now suspended at the rear end of the frame and the capacity has been increased to 10 gals. Fuel is fed to the carburetor by a vacuum tank which is located on the forward side of the dash. Fabric universal joints have supplanted the metallic joints which formerly were located at each end of the propeller shaft.

Slight changes have been made in details to improve the performance of the brakes and springs. The speedometer drive is now taken from the tail shaft of the gear box. Driving ability has been improved by placing the horn button at the top of the steering post at the center of the new aluminum spider which carries a natural wood rim. Instruments have been grouped in a panel at the center of the instrument board.

Considerable attention has been devoted to the design and construction of the new bodies. Roominess is the

first striking characteristic resulting from the changed lines. In order to balance the appearance of the entire car with the larger bodies, the hood and radiator lines have been modified to suit the existing trend of design. The radiator is higher than formerly and has straight line sides which terminate in sharp upper corners which form the ends of the curved line forming the top of the radiator and hood line. Deep, double-crowned fenders round out the car appearance. To insure rigid body construction, an increased number of ribs have been built into the wood frame which supports the steel body panels. Roofs on the closed cars are built over a longitudinal slat construction which is supported by lateral ash bows at a distance of 10 in. apart from front to rear. Doors on the closed models are provided with two rubber bumpers and a spring dovetail pilot to eliminate rattle and rumble. Locks are also built into all closed car doors.

All three models are conventional in design and arrangement. The open car is upholstered in leather fabric over deep curled hair while the sedan is finished in velour and the coupe in blue leather fabric. Seat cushions are built on wood frames which are provided with concealed cleats that register with the seat box instead of fitting into cushion retainers in the conventional manner. All upholstery is put on with concealed fasteners leaving no buttons or tacks visible. In addition to the equipment already mentioned, the sedan has a dome light and robe rail at the back of the front seat.



# British Tests Show Relative Value of Oils as Truck Lubricants

Experiments indicate that volatility is an important item in determining commercial efficiency, while flash point is not good guide to quality. Acidity constant in all samples. Condition of the crankcase is cleaner when aluminum pistons are used.

**I**N the past, engineers generally have held to the opinion that as regards lubricating oils, the best is none too good, and that no price difference warrants use of a cheap oil of presumably poor quality. The difficulty has been to accurately determine the all round lubricating value of an oil. Many physical properties, such as specific gravity, viscosity as related to temperature, flash point, acidity and ash content, can be measured readily, but it is practically impossible to translate these properties into terms of efficiency as a lubricant. It will be realized, therefore, that the service engineer finds himself in a difficult position in choosing lubricants.

Considerations of this nature, combined with the fact that lubricating oils offered on the market varied in price from 29 cents to \$1.48 per U. S. gallon, induced a British operating company to test a number of oils in service and note their effect on the wear of the bearings and cylinder walls, on the carbon deposit, etc. The results of these tests are given in a paper entitled "Some Experiments in the Lubrication of Commercial Vehicle Engines," by H. D. Nickinson, which was read recently before the Institution of Automobile Engineers. As stated by Nickinson the object of the tests was to ascertain whether there is any difference in the results obtained when using different brands of lubricating oils in internal combustion engines and to see whether or not it is good policy to buy an expensive oil for commercial work.

## Test Methods

The method adopted for testing the oils was to use them in a new or recently overhauled engine on a vehicle in ordinary everyday work. Records were kept of oil and fuel consumption, cylinder and crankshaft wear and carbon deposit. The engines were run for six months, the distances covered varying from 20,000 to 24,000 miles. The engines were given the usual shed-day examination, when minor repairs and adjustments, such as valve grinding, were carried out.

At the outset the engine was filled with fresh oil to the correct level, and oil was added each night to make up for that lost. The oil sumps were never drained out during the run, such procedure being considered wasteful and unnecessary, since experiments carried out some time previously showed no advantage when the sumps were drained.

The engines used for oils Nos. 1 and 2 had a bore and stroke of  $4\frac{1}{8}$  by 4 15-16 in. and those for oils Nos. 3 to 7,  $4\frac{1}{2}$  by  $5\frac{1}{2}$  in. Lubrication of the main bearings was by force feed from a pump, the crank pin bearings, piston pin bearings and cylinders being lubricated by splash from constant level troughs.

When the engines had completed the scheduled six-

months run, they were opened up and records were taken of the wear, carbon deposit and general condition, and other outstanding points. This information was compared with the average for the rest of the fleet. Samples of oil were drawn from the crankcase every month and compared with the original oil. From the information thus collected opinions were formed as to the value of the oil, due consideration being given to the price paid.

## Viscosity Drops in January and February

As a result of dilution of the crankcase oil, the viscosity of the oil generally drops during the first two months, and then practically remains constant. Allowance must be made, however, for the period of the year in which the samples are drawn, the general tendency being toward higher dilution in winter. Fig. 1. shows a fuel content curve for the various periods of the year, based on examination of some hundreds of samples of oil taken from engine bases. The amount of fuel in the crankcase samples depends upon the fuel used and upon the crankcase temperature, and it should be pointed out that the fuels used in the engines from which the samples were drawn were No. 3 gasoline and the No. 3 alcohol-benzol mixture (2-1). It has been found that oil taken from an engine after 2 hours of running often has as much fuel in it as samples taken after a month's running. Fig. 2 shows a distillation curve of the No. 3 gasoline.

Crankcase temperatures were taken at the end of each day's work and these temperatures were then averaged for summer and winter. The average oil temperature in summer was 117 deg. Fahr. for an average atmospheric temperature of 56 deg. and the average winter oil temperature was 104 deg. Fahr., for an average atmospheric temperature of 42 deg., showing a temperature rise of the oil over the atmosphere of 61 deg. in summer and 66 deg. in winter.

The flash-point of the used oils approximates to the flash-point of the fuel extracted from the oil. It would appear from this that the flash-point of an oil is not much of a guide as to its lubricating qualities. For example, if a very small amount of gasoline or kerosene is added to an oil, the flash-point is lowered, but it is hardly correct to say that the oil has lost its lubricating qualities. In the selection of lubricating oils for internal combustion engines, the heat-loss or volatility of an oil is important.

## No Relation Between Flash Point and Volatility

There is no necessary relation between flash-point and volatility. An oil having a high evaporation value would be uneconomical in use, and in all probability would give trouble owing to the heavy residue which is left after



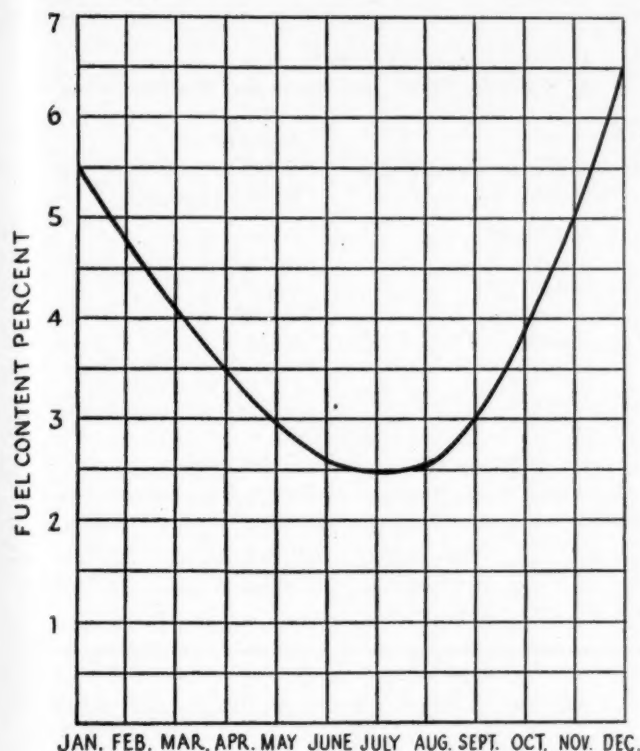


Fig. 1—Fuel content of crankcase oil throughout the year

the lighter fractions have been driven off, causing gumming and sticking.

This trouble would be very noticeable in cases where light oils had been used for blending. The heat-loss value might very well take the place of the flash-point test in specifications, especially for motor oils, since the flash-point is only a detriment at the temperature at which sufficient vapor is evolved to ignite momentarily on the introduction of a small flame, whereas the heat-loss would be a measure of the evaporation taking place under working conditions. The condition of the oil after the evaporation test has been taken is important, any thickening or gumming being objectionable.

#### Maximum Ash Output

The maximum ash output is reached after about two months, then falling slightly. This decrease is no doubt due to the gradual settlement that takes place when the oil is hot. The estimation of the ash content was always made as soon as possible after the sample was drawn, so as to obtain a representative determination of the matter circulating with the oil. The presence of the siliceous matter would not appear to have any detrimental effect on the bearings, since in many cases it has not been found necessary to strip connecting-rods from crankshafts after 24,000 miles running, and there has been found to be no reduction in cylinder wear when the oil sumps have been drained and fresh oil supplied every month. The values obtained for acidity appear fairly constant in all the samples. This acidity is no doubt due to oxidation.

As regards carbonization and carbon deposits, there was very little to choose between the various oils. With oil No. 7 the interior of the crankcase was dirtiest, No. 1 and No. 5 followed, and No. 4 gave the cleanest engine. The condition of the crankcase is much cleaner when aluminum pistons are used. When cast-iron pistons are used, any oil splashed up on to the under side of the piston is slowly coked, lumps of carbon forming and falling into the crankcase. When aluminum pistons are used, there

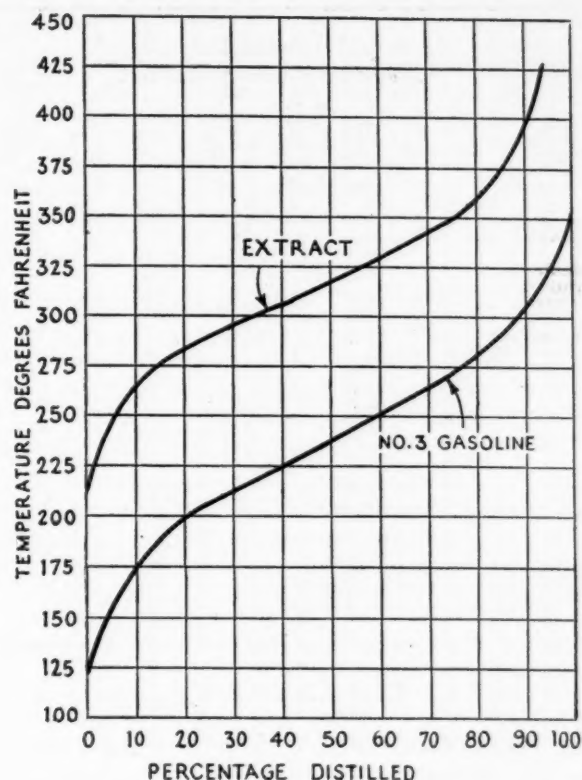


Fig. 2—Distillation curves of fuel used and of fuel extract from crankcase oil

is no such carbonaceous formation, which is no doubt due to the superior heat conductivity of aluminum, which keeps the pistons cooler.

Regarding carbon deposits on the piston tops, there was little difference in the various oils. Oil No. 5 was the worst, followed by oil No. 3. There is no doubt that if oil gets onto the piston tops it carbonizes, the amount being governed by the condition of the piston and rings. The amount of deposit would appear to reach a maximum, any further formation being blown out of the exhaust. In fleet operation as much deposit has been found in a month on some engines as others doing the same work take three months to accumulate, yet in both cases the same oil has been used.

From these tests there does not appear to be much connection between the Conradson value and the amount of carbon deposit formed. It will be noticed that there is a very great increase in the Conradson value of a used oil when compared with the original new oil.

In making comparisons of oil consumption, too much importance should not be attached to the performance of individual engines. The chief determining factor of oil consumption would appear to be the condition of the pistons and rings, and it is only to be expected that as these become worn the oil consumption will increase.

It is interesting to compare the three engines on oil No. 3. Practically the same mileage was run in each case, yet engine No. 1843 used 50 per cent more oil than either No. 1695 or No. 1700. There was nothing in the condition of the engines when examined to account for this difference. Oil No. 4, which has the worst consumption figures for these tests, is giving nearly three times as many miles per gallon in fleet operation on eighty vehicles. In connection with oil consumption, it would not be economical to use an oil with a high evaporation value. Table III. shows a comparison of the consumption figures for the seven oils.

Statements are frequently made to the effect that certain brands of oil, owing to their superior friction-re-

TABLE I

## Analyses of Oils Nos. 1 to 7

Oil	1.	2.	3.	4.	5.	6.	7.
Sp. gr. at 60° F. ....	0.936	0.923	0.929	0.911	0.917	0.933	0.934
Viscosity, 140° F. ....	178	137	155	132	177	148	125
(Redwood.) 200° F. ....	56	53	56	53	59.5	54	51
Flash-point, Deg. F. ....	360	369	350	387	347	375	338
(P.M. closed.)							
Pour point, (A.S.T.M.)	Flows at 16° F.	Flows at 16° F.	Sets at 16° F.	Flows at 16° F.	Flows at 16° F.	Flows at 16° F.	Flows at 16° F.
Saponifiable oil, ....	Nil.	Nil.	Nil.	Nil.	Nil.	2%	Nil.
Conradson.							
Carbon, per cent	0.1	No Record	0.5	0.1	0.35	0.13	0.1
Heat-loss per cent, 1 hr. at 200° C. in Archbutt's vaporimeter	15	16	24	12	17	25	20

Note.—Pour point tests not carried below 16° F.

TABLE III

## Comparison of Oil Consumption

Assuming Fleet Average to Be 100 Miles per Gallon

Oil No. 1.....	112 m.p.g.	Oil No. 5.....	130 m.p.g.
Oil No. 2.....	120 m.p.g.	Oil No. 6.....	136 m.p.g.
Oil No. 3.....	100 m.p.g.	Oil No. 7.....	177 m.p.g.
Oil No. 4.....	64 m.p.g.		

TABLE II

## Cylinder Wear, per Bore per Month

Oil No.	Fleet Average	
1. 0.002 in. ....	0.002	} Old type vehicles.
2. 0.0015 in. ....	0.002	
3. 0.0013 in. ....	0.0015	} New type vehicles.
4. 0.0017 in. ....	0.0015	
5. 0.0015 in. ....	0.0015	
6. 0.0016 in. ....	0.0015	
7. 0.0025 in. ....	0.0015	

TABLE IV

## Comparison of Fuel Consumption

Assuming Fleet Average to Be 10 Miles per Gallon

Oil No. 1.....	10 m.p.g.	Oil No. 5.....	9.6 m.p.g.
Oil No. 2.....	9.95 m.p.g.	Oil No. 6.....	9.7 m.p.g.
Oil No. 3.....	10.08 m.p.g.	Oil No. 7.....	9.7 m.p.g.
Oil No. 4.....	10.5 m.p.g.		

ducing qualities, will enable a higher mileage to be covered per gallon of fuel. From the records of the seven oils there would appear to be little if anything in the argument for commercial work. On the racing track, and on the experimental test bench, where precautions are taken to eliminate all variables, oils with a smaller coefficient of friction may give better results than oils with a greater friction coefficient, but in operating under commercial conditions there are so many varying factors to contend with that any advantage there might be from a reduced coefficient of friction could easily be nullified. Table IV. shows a comparison of the fuel consumption of the engines running on the seven oils.

Table II. gives details of cylinder wear per bore per month, and the fleet average for comparison. It will be seen that oil No. 2. is the only one that shows any real reduction in wear. Unfortunately the extra cost of this oil more than counterbalanced the saving. The average mileage of each engine in fleet operation works out to between 3800 and 4000 miles per month.

## All Samples Give Satisfaction

In spite of the differences between the original oils and the samples drawn from the crankcases, each of the seven oils gave satisfactory lubrication, none of the engines showing signs of lack of lubricant.

Oil No. 4 appears to be very stable, showing the least fluctuation from the original oil. In fleet operation it gives most excellent results. Oil No. 3 has also given good results in fleet operation.

There was very little difference between the seven oils in respect of carbonization and carbon deposits.

Fuel dilution rarely exceeds 5 per cent. Oil No. 4. shows the lowest figures, although this engine was run during the winter months.

It would not appear to be necessary to drain out the crankcase every 1000 miles, as is advocated in some quarters; the waste of oil and the time taken in large fleets would nullify any advantage which might accrue from this practice.

The cry at the present time is for economy in the use of petroleum products. As these vehicles were part of a commercial fleet, and expected to pay their way, the oil that cost the least and gave satisfactory results would be the best oil to use. Omitting the oil consumption figures for the reasons already stated, there is practically and

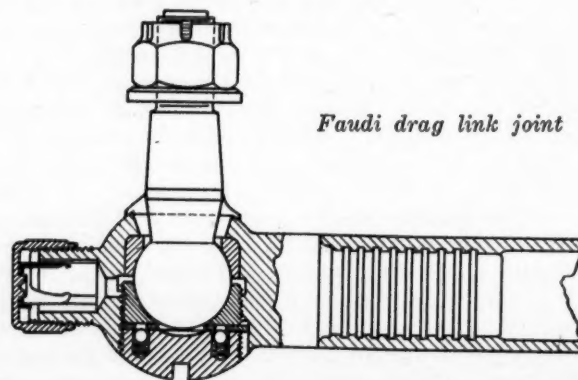
commercially no difference between the results obtained with the seven oils. Certainly oil No. 2. does show a reduction in the cylinder wear, but not sufficient to justify its extra cost. The results of these tests do not show what this "better lubrication" is, except that the cheapest oil has done the job as satisfactorily as the most expensive.

## Novel Ball Joint for Drag Links

A sectional and an outside view are shown herewith of the Faudi ball joint for steering connections which is manufactured in Germany and used on many German cars. The ball housing, made of mild steel, is provided with a shank turned with a considerable number of circular flanges, and the upset end of the tube is united with this shank by swaging or some similar process.

The ball stud is made of chrome nickel steel and is provided with a tapered shank for fastening it into the steering arm. The two socket rings also are made of chrome nickel steel, and these various wearing parts of the joint are case hardened and ground. The parts are held together by a screw plug which is locked by means of a tongued washer and a number of spring-pressed balls engaged into holes in the washer. The body of a grease cup is formed integral with the ball housing, and a brass cap with spring lock is screwed over it.

Protection against dust and dirt is afforded by a spherical washer slipped over the ball stud and making a good joint with the ball housing. These joints are made in sizes of from 8 to 14 mm. ball diameter and for tubes of from 20 to 35 mm. outside diameter.



Faudi drag link joint



# Nine Months Tractor, Motorcycle, Battery & Spark Plug Exports

COUNTRIES	TRACTORS						MOTORCYCLES			STORAGE BATTERIES		SPARK PLUGS, MAGNETOS	
	Garden		Wheel		Track Laying		Parts			Parts			
	No.	Value	No.	Value	No.	Value	Value	No.	Value	Value	No.		Value
Europe													
Austria								79	\$18,408	\$1,845	100	\$1,150	\$76
Azores and Madeira Islands							\$8	27	5,592	593			50
Belgium	7	\$5,696	850	\$303,182	56	\$38,724	14,367	527	110,718	24,078	3,066	35,926	14,999
Bulgaria							333						
Czechoslovakia							92	315	77,927	15,856			796
Denmark			897	311,378			27,515	523	121,942	79,448	8,302	109,474	9,674
Estonia			81	30,190	2	1,370	2,585	35	10,289	2,502	4	135	4,034
Finland	1	175	102	36,673			1,503	194	44,628	15,886	42	709	5,930
France	1	159	1,070	405,578	10	7,943	55,884	424	80,011	40,128	6,579	56,886	100,508
Germany	1	137	16	16,187	1	1,739	2,238	92	19,960	2,244	100	1,600	228
Gibraltar			1	900			30						410
Greece					2	8,418					58	903	724
Hungary							474						
Iceland and Faroe Islands			7	1,970				1	312		25	144	257
Italy			260	88,781			30,141	1,075	250,469	34,326	178	1,438	13,379
Latvia	51	8,404	226	99,342	10	12,500	4,331	11	3,363		40	153	
Lithuania			4	3,000			426						
Malta, Gozo and Cyprus			10	3,682				1	191	130	16	264	100
Netherlands			9	5,248	22	13,300	605	2,009	491,453	76,124	824	12,283	9,862
Norway			15	5,466			1,219	475	113,046	40,980	1,178	20,531	5,800
Poland and Danzig	2	259	50	15,149			6,217	56	14,549	20,896			592
Portugal			2	1,299			580	63	18,782	5,220	141	1,706	2,355
Rumania							855	4	1,095	1,849	1	25	
Russia			353	151,354	2	15,850	25,129				20	382	2,062
Spain	20	5,925	381	134,159	9	6,375	14,452	386	91,004	10,508	5,122	72,581	29,437
Sweden			32	13,066			13,217	1,011	242,896	63,372	1,015	17,241	20,992
Switzerland					10	7,250	574	295	65,816	8,386	102	1,592	1,019
Turkey	15	5,550	71	26,57			1,108						503
Ukraine			142	55,810			17,378						720
England	25	4,262	1,138	439,924	15	21,308	61,790	728	164,905	62,746	8,629	147,250	39,024
Scotland					2	1,708	346				45	525	841
Ireland			20	6,225			335				98		
Jugoslavia, Albania and Fiume								17	4,331	245			
North and South America													
Canada	34	10,927	5,168	3,862,648	49	123,801	544,424	700	154,997	146,491	14,816	178,685	504,985
British Honduras	9	2,882	35	28,246	8	27,252	8,831				9	210	966
Costa Rica							1,037	1	250	44	100	2,392	260
Guatemala			4	4,668			446	22	5,662	1,568	167	3,793	617
Honduras			20	20,620	5	15,551	2,447	14	2,337	353	80	1,686	3,909
Nicaragua			2	1,248	1	2,750	5,525				178	3,096	1,553
Panama			1	351			2,744	8	1,791	1,825	660	13,414	6,921
Salvador			1	720			80			91	316	4,851	329
Mexico	88	7,750	123	64,912	16	52,310	107,482	52	11,340	21,288	4,290	94,160	21,125
Newfoundland and Labrador			1	351	4	13,180	3,729	1	162	147	219	2,941	2,261
Barbados	2	340	3	1,076	1	5,468	84	1	100	107	76	1,088	1,627
Jamaica			1	620	1	2,335	1,259	14	2,489	744	441	6,748	925
Trinidad and Tobago			5	1,831			1,231	9	1,369	140	258	4,003	3,025
Other British West Indies	8	1,390	1	351			645	9	2,043	6,594	144	2,165	648
Cuba	11	5,441	297	152,143	30	102,724	70,331	41	8,571	30,653	4,388	73,797	27,654
Dominican Republic			14	5,013	1	500	8,350	17	2,619	2,680	155	1,729	3,336
Dutch West Indies			1	351				5	1,027	133	19	362	155
French West Indies			11	4,063			1,562	1	130		19	221	122
Haiti			2	850			220				74	101	2,058
Virgin Islands	1	170					148		89	168	13	342	36
Argentina	71	18,001	1,375	860,782	14	43,212	92,399	185	45,192	28,402	21,100	206,717	64,048
Bolivia			3	1,57				52	13,832	325	16	251	
Brazil	1	111	201	71,876	3	14,125	11,750	50	10,627	2,411	6,100	80,841	12,951
Chile			70	24,782	23	11,220	13,500	12	2,765	1,120	683	21,459	7,834
Colombia	3	621	20	12,501	9	13,352	47,030	5	1,638	982	240	4,874	3,924
Ecuador			9	7,783	4	4,397	979				96	2,157	1,605
British Guiana			25	11,518	10	38,260	824	4	646		43	86	1,012
Dutch Guiana							191				67		640
French Guiana													69
Peru			55	25,811			33,526	5	904	672	890	10,353	4,719
Uruguay	19	1,630	145	59,584			11,991	25	6,688	4,873	2,135	18,111	2,304
Venezuela			6	8,652	6	35,755	52,975	15	3,662	927	202	3,680	3,969
Asia													
Aden	1	109					184	549	139,746	191			747
British India			29	56,659	15	31,246	46,929	194	46,176	14,222	4,910	43,912	9,811
Ceylon							173	20	5,477	1,826	245	4,453	1,576
Straits Settlements					3	3,995	1,457	8	1,578	2,105	897	15,483	17,671
Other British East Indies							25	1	124	1,362			
China			2	4,316			752	67	17,381	4,019	1,322	26,508	4,728
Chosen							15			278			780
Java and Madura			1	576			4,428	106	20,539	30,772	931	15,106	11,866
Other Dutch East Indies							17,113	1	360	5,592	42	732	2,408
Far Eastern Republic			6	6,130			742				3	27	
French Indo China								3	600	276			56
Hojaz, Arabia and Mesopotamia							15				25	300	708
Hongkong								49	9,492	1,818	122	2,727	2,051
Japan	48	9,973	30	14,073	36	122,616	5,425	802	179,477	120,980	931	23,496	75,160
Kwantung											25	194	89
Palestine and Syria			21	10,276			1,663	9	2,362		81	1,616	4,085
Persia											2	75	
Philippine Islands	1	223					21,415	32	6,229	9,020	1,166	27,767	15,464
Siam			1	659			433	1	151	61	57	1,623	537
Turkey							470						24
Oceania													
Australia	13	10,424	1,736	1,129,426	238	276,885	94,689	3,804	919,229	187,546	12,115	182,867	78,677
British Oceania			4	5,517	2	9,133	1,762	10	1,708	370	277	4,523	378
French Oceania			4	1,600			30			232	8	167	148
New Zealand	1	180	36	22,932			15,051	1,192	302,601	63,544	4,459	77,435	19,167
Other Oceania								1	290	144	17	372	186
Africa													
Belgian Congo			7	3,113			2,227			554			
British West Africa			1	1,025			174	10	2,247	348	20	322	5,550
British South Africa					2	1,437	8,027	612	149,793	41,766	6,037	125,002	9,720
British East Africa	2	547	6	7,812	29	17,693	2,078	31	7,725	3,260	155	2,456	562
Canary Islands								2	428		96	1,715	370
Egypt					2	13,929	1,820	49	11,985	6,069	60	1,154	3,202
Algeria and Tunis			43	22,429	26	22,845	4,707	3	444				341
Other French Africa								8	1,547	331			110
Liberia													101
Madagascar					3	3,035						</	

# Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS						GASOLINE TRUCKS							
	Up to \$500		\$500 to \$800		\$800 to \$2000		Over \$2000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Europe														
Austria	27	\$12,474	22	\$14,136	1	\$1,106								
Azores and Madeira Islands	2	767							4	\$1,700				
Belgium	23	8,712	23	13,409	31	38,993	16	\$51,971						
Czechoslovakia	4	500												
Denmark	26	5,602	3	2,031	90	106,693	2	5,353			2	\$2,219		
Estonia					2	3,294	1	3,857						
Finland	3	1,454			3	3,238					1	1,275		
France	1	450	1	600	5	7,025	1	2,800					1	\$3,157
Germany			2	1,237			1	4,000						
Gibraltar														
Greece	2	856			5	4,436								
Hungary														
Iceland and Faroe Islands														
Italy	100	25,103	1	800	1	888			30	8,066				
Latvia									1	500				
Lithuania														
Malta, Gozo and Cyprus	16	6,962			1	1,565								
Netherlands	1	336	15	8,240	29	36,481	5	16,672	2	390				
Norway			6	4,598	36	38,753	1	2,692			7	9,664		
Poland and Danzig			2	1,495	13	17,280	1	2,300						
Portugal			9	5,750	8	10,217	1	2,697						
Rumania	1	495	4	2,020	4	4,090								
Russia														
Spain	51	21,734	95	61,981	105	214,883	44	118,076			6	6,201		
Sweden	1	500	88	56,488	118	141,694	2	4,200			15	16,716		
Switzerland			7	4,856	34	37,264	3	7,637						
Turkey					1	1,232								
Ukraine					1	1,686								
England	7	2,026	184	116,691	69	77,370	7	18,550	294	119,031	23	24,978	11	25,783
Scotland														
Ireland	2	425												
Yugoslavia, Albania & Fiume	1	495					3	9,230						
North and South America														
United States														
Canada	56	12,962	187	111,767	375	445,921	43	145,348	33	18,796	21	26,665	10	31,098
British Honduras														
Costa Rica			2	1,440	3	3,826								
Guatemala	4	1,767	7	4,674	8	10,175			1	450				
Honduras	4	1,522												
Nicaragua					5	6,503								
Panama	9	3,326	15	9,672	38	48,794	2	4,800						
Salvador		364			6	6,437							2	11,513
Mexico	495	107,846	179	124,652	110	128,379	10	28,710	39	12,724	7	9,860	3	9,790
Miquelon, Langley and St. Pierre			1	754	5	6,469			3	1,500				
Newfoundland and Labrador														
Barbados	7	3,076	2	1,488	4	3,819					1	1,830		
Jamaica	28	10,282			25	29,275			11	4,483	2	1,500		
Trinidad and Tobago	4	1,480	5	3,654					1	500				
Other British West Indies	10	4,130			4	5,268			41	11,746	2	4,372	1	5,600
Cuba	338	96,091	89	64,093	71	90,490	17	55,475					1	2,096
Dominican Republic	65	23,158	6	4,287	21	24,936	2	4,514						
Dutch West Indies	3	1,196			1	1,093			2	712				
French West Indies	1	364												
Haiti	6	2,151	11	8,007	8	9,670	1	2,600						
Porto Rico														
Virgin Islands					1	1,279								
Argentina	346	157,708	506	320,849	449	472,145	18	38,484	16	18,700	3	6,545	10	31,458
Bolivia					6	8,099								
Brazil	10	4,904	76	40,693	124	132,934	3	6,013						
Chile	5	1,562	8	6,101	28	30,409	4	8,390	3	2,775	4	5,552		
Colombia	12	3,831	8	5,004	18	19,824	1	2,636	10	3,104				
Ecuador														
British Guiana	15	4,977			1	1,020								
Dutch Guiana	1	458												
French Guiana														
Paraguay														
Peru	59	20,040	16	11,914	32	34,483	1	3,500	69	24,544	6	7,082		
Uruguay	509	149,409	33	20,796	53	58,718	3	7,455	126	41,408				
Venezuela	55	20,256	4	2,785	14	14,637	3	8,678	15	5,484	1	1,432		
Asia														
Aden														
British India	56	23,787	94	62,735	41	49,581	2	4,585	11	7,139	14	13,420		
Ceylon	1	453	8	4,877	9	11,506			1	1,498	6	8,700	1	1,182
Straits Settlements	11	5,110	8	4,651	22	22,817					1	1,575		
Other British East Indies														
China	10	3,128	15	10,214	19	18,517	1	2,500	16	6,216				
Chosen														
Java and Madura	21	9,900	41	28,411	87	85,756								
Other Dutch East Indies			3	2,172	5	4,843								
French Indo China			4	2,864										
Hejaz, Arabia and Mesopotamia			1	785										
Hongkong	3	1,073			12	12,540			10	6,680	2	1,388	1	10,000
Japan	116	35,795	44	28,946	34	39,177	9	27,311	974	337,378	68	80,419	56	141,183
Kwantung														
Palestine and Syria			13	9,317	10	11,631								
Persia	11	3,423												
Philippine Islands	60	19,198	49	34,901	105	108,540	2	4,874	42	15,414				
Siam			3	2,148										
Turkey														
Oceania														
Australia	537	206,506	802	520,771	930	983,619	38	88,997	155	95,701	30	68,605	9	26,237
British Oceania														
French Oceania	1	210			1	1,122								
New Zealand	119	51,104	111	76,453	118	129,991	5	16,400	5	6,627	6	11,629		
Fiji Islands														
Africa														
Belgian Congo	8	3,031							11	3,992				
British West Africa	1	458	7	4,944	7	6,196			5	2,852	17	19,957		
British South Africa	107	46,163	185	127,530	340	338,000	1	3,678	10	10,642	3	4,763		
British East Africa	1	450			24	25,129			2	1,426				
Canary Islands	4	1,498	4	2,020	4	4,583			7	3,051	2	2,956		
Egypt	4	1,880	3	2,148	7	5,885								
Algeria and Tunis														
Other French Africa	11	3,799	1	540	1	900								
Morocco														
Portuguese East Africa	2	634	2	1,458	4	4,169								
Other Portuguese Africa	2	725							5	1,818				
Spanish Africa			1	724										
Total	3,387	\$1,200,976	3,016	\$1,965,571	3,807	\$3,207,302	254	\$714,983	1,955	\$777,047	250	\$339,303	106	\$299,060

ELECTRIC VEHICLES

No.

3

1

3

1

2

1

2

1

1

1

3

13



October, 1923

## Canadian Exports

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS		TRUCKS		PARTS	COUNTRIES
No.	Value		Casings		Solid		Inner		No.	Value	No.	Value		
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
			242	\$3,384			242	\$474						Europe
		\$145												Austria
		66,138	232	3,090	1	\$45	171	201	14	\$10,858				Azores and Madeira Islands
		277	11	120										Belgium
		242,990	495	8,905	37	1,700	151	429	1	409			\$11,050	Czechoslovakia
		210							2	2,523				Denmark
		1,292	208	2,276	8	315	237	428	3	1,609				Estonia
		271,797	67	1,776			7	56						Finland
		396	517	13,841			198	886						France
		490												Germany
		4,426	1,162	16,171	313	7,991	1,697	2,838					346	Gibraltar
		72	14	287										Greece
		17,951	1,055	10,930			71	121						Hungary
														Iceland and Faroe Islands
														Italy
														Latvia
														Lithuania
														Malta, Gozo and Cyprus
3	\$3,190	35,549	433	5,385	10	286	770	1,160	18	18,496			499	Netherlands
		30,777	840	14,471	105	5,308	1,716	2,752	11	10,743			57	Norway
		15,000	20	454					4	4,182			92	Poland and Danzig
		3,077	10	187					7	6,547				Portugal
		1,435							2	945			118	Rumania
		1,109							1	1,313				Russia
1	1,820	61,314	6,280	95,162	542	13,505	3,849	6,861	3	1,771			110	Spain
		36,902	811	10,524	18	906	399	652	69	72,359				Sweden
		7,246	12	1,261			12	114						Switzerland
		445	40	382			30	46	1	405				Turkey
3	5,032	271,481	5,272	54,492	1,340	34,535	500	450	918	918,235	206	\$118,036	29,592	Ukraine
		19	20	850	116	3,329	1,416	2,817						England
		104,847	295	2,285			31	53						Scotland
			97	1,224					1	477				Ireland
														Yugoslavia, Albania & Fiume
1	2,500	1,900,161	2,532	32,511	100	4,169	1,037	2,156	27	6,690	4	3,783	18,501	North and South America
		382	20	225			12	8						United States
		600	52	617	32	829	150	254						Canada
		1,665	50	809			46	107	1	1,246				British Honduras
		2,200	31	713	2	63	43	114						Costa Rica
		302	16	242	4	44	62	102						Guatemala
		10,925	997	11,410	55	859	768	1,000						Honduras
		7,391	64	917	5	149	96	168	8	8,059			252	Nicaragua
2	760	82,521	4,062	48,941	438	9,437	4,774	9,165	27	29,012				Panama
														Salvador
														Mexico
		677	20	272	2	40	31	67	4	1,437	4	1,493	105	Miquelon, Langley and St. Pierre
		1,781			16	329			5	3,684			860	Newfoundland and Labrador
		14,183	462	6,310	46	909	634	1,144	1	1,296			19	Barbados
		7,033	38	560			24	61	2	884				Jamaica
		4,257	95	930	2	30	115	172	3	2,365			26	Trinidad and Tobago
		90,688	3,352	33,604	338	11,780	3,430	4,550	17	16,929				Other British West Indies
		12,394	733	6,898	126	3,528	620	855	5	5,870				Cuba
		1,631	127	1,164			159	238	1	595				Dominican Republic
		906	122	1,133										Dutch West Indies
		6,815	180	3,274	7	185	220	480	1	610				French West Indies
									2	2,492				Haiti
		1,003	20	135			34	38						Porto Rico
		705,526	6,707	71,189	80	2,993	3,351	6,097	262	219,569			15,374	Virgin Islands
		1,286	28	993			48	59	6	7,491				Argentina
		301,599	160	2,566	15	445	100	173	22	22,172			12,897	Bolivia
		19,323	1,407	19,634			310	890	7	9,027				Brazil
		9,315	532	7,255	12	450	825	1,518	3	3,738				Chile
		2,804	8	119			89	199						Colombia
		2,373	174	1,729			144	199	14	10,182			13	Ecuador
		22											56	British Guiana
		499												Dutch Guiana
		2,948												French Guiana
		13,338	615	7,136	55	1,665	343	800						Paraguay
		16,586	1,092	11,604	24	204	1,115	1,868	25	24,101				Peru
		9,363	713	9,635	14	283	1,009	1,616	10	11,874				Uruguay
														Venezuela
														Asia
		77	235	1,608	289	10,084	35	54			4	1,304		Aden
		25,050	1,525	15,023	177	4,156	1,154	1,708	577	308,785	44	14,536	2,805	British India
		1,676	582	6,290	52	1,593	676	1,074	56	25,488	32	10,624	7,956	Ceylon
		32,123	678	5,513			171	485	126	49,091	12	4,008	17,516	Straits Settlements
		117												Other British East Indies
		13,663	597	8,236	20	250	492	1,202					5	China
		6,925												Chosen
		23,121	707	8,924	236	6,899	863	1,391						Java and Madura
		1,878	115	1,660	38	822	87	169	144	61,606			11,446	Other Dutch East Indies
		615	45	497			25	39						French Indo China
		1,752												Hejaz, Arabia and Mesopotamia
		4,299	71	990			49	100	20	17,282				Hongkong
3	5,410	122,486	7,265	78,729	1,074	11,088	3,582	7,401	6	5,117				Japan
		197	10	110										Kwantung
		10,244	704	10,344	22	552	324	658	1	629			14	Palestine and Syria
														Persia
		19,848	5,327	62,875	128	4,492	5,307	9,233						Philippine Islands
		2,888	20	220					8	2,929	14	4,676	853	Siam
		723												Turkey
														Oceania
		275,680	3,310	42,513	525	19,559	2,168	4,975	1,409	490,598	667	232,216	67,061	Australia
		569	82	902			100	158			1	334	708	British Oceania
		622	26	639	4	75	39	145						French Oceania
		51,245	1,169	15,155	90	4,058	1,769	2,481	814	466,390	120	40,080	19,816	New Zealand
		261	12	140			29	43	12	3,846			386	Fiji Islands
														Africa
		863	12	101										Belgian Congo
		8,920	93	2,245			81	313	41	11,417			2,138	British West Africa
		72,444	921	12,479	144	5,133	1,819	3,284	252	172,665			1,007	British South Africa
		2,651	739	7,794			647	1,148	46	19,887	31	10,210	4,906	British East Africa
		3,009	561	6,943	45	1,298	215	435	4	2,336				Canary Islands
		8,916	228	2,714			339	461					183	Egypt
		30												Algeria and Tunis
		7,839	4	42										Other French Africa
		2,058												Morocco
		330												Portuguese East Africa
		1,525	3	35			1	2	2	1,807				Other Portuguese Africa
			39	625	36	942	50	110						Spanish Africa
13	\$18,712	\$5,113,130	67,852	\$824,910	6,789	\$178,764	51,168	\$92,174	5,028	\$3,081,157	1,229	\$441,300	\$227,397	Total



# The FORUM



## Defective Brakes Claimed to Be Important Cause of Accidents

*A. A. Mowbray of Asbestos Brake Lining Association disagrees with views of C. W. Price, safety expert. Says examinations in various cities prove many injuries are due to brake troubles.*

Editor, AUTOMOTIVE INDUSTRIES:

It was with interest that I read in your issue of Dec. 13 an article signed by C. W. Price, entitled "Automotive Industry Should Lead in Safety Movement."

Your publication is to be commended for calling the attention of the automotive industry to the importance of doing everything possible to reduce the number of motor accidents for, in my humble opinion, there is no greater problem before the nation today. Last year 12,000 persons were victims of automobile fatalities and that number is liable to be increased during 1923.

Regarding the mention of the part that automobile brakes have in motor accidents, however, I disagree with Mr. Price. In the first place, it is impossible to obtain any accurate figures regarding the number of accidents that may be traced to defective brakes. You will appreciate that many motorists will not admit that their brakes were defective after an accident has taken place, for the very simple reason that in New York and other cities such an admission would amount to a confession of having violated the State law, local ordinance or traffic regulations which declare that all motor vehicles must be equipped with adequate brakes. That is why the figures quoted by Mr. Price to the effect that a recent analysis of 2000 motor vehicle accidents revealed the fact that defective brakes were responsible for only nineteen of them, should not be taken too seriously.

I disagree with Mr. Price in his attitude that defective brakes constitute only a minor cause of accidents.

May I call your attention to the fact that Marcus Dow, past president of the National Safety Council and now executive secretary of the Department of Public Safety, City of New York, has been quoted in the press as saying that poor brakes are responsible for the largest number of automobile accidents. Here in New York Mr. Dow's Brake Squad during the past year has tested the brakes of 73,633 motor vehicles. Of this number 10,517 had one defective brake. In 2239 cases both brakes were defective.

Statistics compiled by a leading advertising agency show that there are 3,000,000 cars in this country with faulty brakes!

Brake tests made last month at Evansville, Ind., showed that nine out of every ten automobiles that were examined had defective control apparatus.

One day recently when brakes were examined in Erie, Pa., it was found that 36 cars out of 60 had faulty brakes.

That the National Brake Inspection Movement has succeeded in making the people of Buffalo brake conscious is

shown by the fact that out of 1104 machines that were examined only 181 had bad brakes. This small number is attributed to the fact that the people of Buffalo were impressed by the publicity obtained by the National Safety Council during its annual congress there recently, when all of the newspapers carried articles presenting the slogan "Brake Inspection—Your Protection," with the result that motorists had their brakes examined at garages and service stations before the police inaugurated their tests.

To date more than 200 cities have shown an interest in the National Brake Inspection Movement. Requests for information on this subject have been received from safety councils, chambers of commerce, automobile clubs, police commissioners, etc., not only in this country but also from Canada, Australia, England, Hawaii and Italy.

Publicity matter regarding the National Brake Inspection Movement is not only being distributed by the Asbestos Brake Lining Association, but the National Safety Council, American Automobile Association, National Motorists' Association, Automobile Club of America, National Automobile Chamber of Commerce, Society of Automotive Engineers, International Bureau of Traffic Police and scores of local organizations are calling the attention of their members to the importance of adequate brakes.

Realizing that your space is limited, I shall not go into further details but request that you publish this reply to Mr. Price's criticism of the work that is being done in this connection.

A. A. MOWBRAY,  
Commissioner,  
Asbestos Brake Lining Assn.

## Aluminum imports are not restricted, Pannell says

Editor, AUTOMOTIVE INDUSTRIES: As you readily conceive, we look for good and valuable information in every issue of AUTOMOTIVE INDUSTRIES and are hardly ever disappointed. However, in the issue of Dec. 6, under the heading "Metal Markets" there is an example of imperfect appreciation of metal market affairs.

It is stated that in respect of aluminum "Importers are reported to have been put on disappointingly short rations." As a matter of actual facts this is hardly true. In the case of the British Aluminum Company, a very large allotment has been made for the United States market, all of which has been sold over the first half of the



year 1924. Although you will appreciate our reluctance to give actual figures, I can assure you that our company is shipping as great a tonnage of aluminum to the United States as it ever has shipped in any previous year and furthermore that this tonnage represents a very substantial proportion of the Company's production. Owing, however, to the vastly stimulated demand and to the fact that the domestic producer appears to be behind schedule in deliveries, there is an excess of demand over supply.

In other words, this does not mean that any consumer is unable to get material for his present uses but that some consumers have been unable to contract for as far ahead as they would like to do.

One very important and far-reaching fact which your correspondent probably has not taken into account is the record low rainfall for the past year, which has affected all parts of the northern hemisphere of the world. When you consider that 100 per cent of the aluminum sold in this market is produced by water power, that most of these power plants are supplied from storage reservoirs and that virtually every one of these reservoirs has been, during this year, far below the minimum normal level, you will see that there is a powerful reason why shipments of aluminum from various sources did not always come up to time and why there are probably still some arrears to fill.

To accuse any producer of following "an astute sales policy" would be entirely fatuous because aluminum is the one product in which it spells bankruptcy to restrict production. The overhead charges are so high that limiting production by a small percentage immediately increases the cost per ton of metal. For this reason, you can be assured, and we believe this goes for other producers also, that we are in this business to produce and sell all the aluminum we can and this is borne out by the fact that among other producers the British Aluminum Company is at present beginning a very large extension to its power plants, which will lead to a greatly enhanced production.—Ernest V. Pannell, The British Aluminum Co., Ltd.

## Local markets best field for small truck builders

Editor, AUTOMOTIVE INDUSTRIES:

I have read very carefully your article on "Where Is the Truck Industry Going?" and it coincides so closely with my ideas that I am going to keep it.

I have seen this from the very beginning of our organization and have deviated very little from my original ideas. However, in 1919, when I incorporated the Eagle Company, we had several men with us who wanted to distribute our product over the entire world in an impossible period. I was told I was too conservative in wanting to draw a circle around our wonderful territory of St. Louis. Consequently the first year considerable money was spent for national advertising that did not do us any more good than if it was thrown to the newsboys to watch them scramble for it.

However, conditions of 1919 did not last very long, and in 1920 we drew our circle around the city of St. Louis, and we have hammered this territory and have paid dividends off the profits we have made. We will probably get at handling national or international distribution, but we will work out from our nucleus and when we do we will make money as we go along.

Although we placed trucks the first year in fourteen States of the Union and in ten foreign countries, we did not make a dime on the trucks that went into the foreign

countries or the trucks that went into the States, but we have made money on every truck sold since we drew our circle around St. Louis.

Our assurance in building has always been that even the town of Babylon must be built on a foundation sufficiently strong to withstand any superstructure placed upon it. If the foundation was not strong enough it was sure to come down. No more can any industry be built from the top down, as it would be from a young company starting out for a national and international distribution upon a weak foundation.

As I stated before, we have made money on all our trucks placed in our local territory and we have paid dividends from profit on them, and we are in a position where we do not owe anybody any money, never failed to discount our bills and our bank balance has always been more than sufficient for our needs.

Now when we spread the points of our compass and take in a larger circle, say 200 miles more, we are going to make money on the trucks placed in this circle, and from year to year, as our circle grows larger, we will make more money and will gradually build on a concrete and steel foundation and a national or international distribution in time to come.

J. P. REIS, President,  
Eagle Motor Truck Corporation.

## Book gives calculations needed in engine design

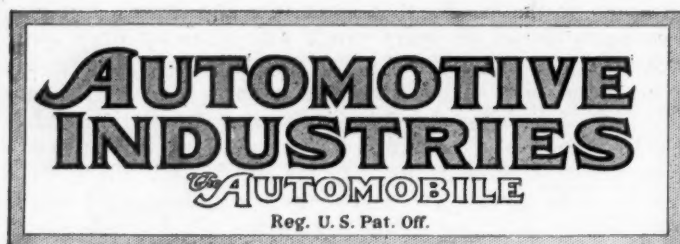
WITH progress in the development of the gasoline engine there has arisen a tendency to proportion its parts more closely in accordance with the stresses they will have to bear than was formerly the case. This inclination on the part of designers to be guided by accurate calculations rather than by rule of thumb was promoted to a considerable extent by the application of gasoline engines to aircraft work, in which lightness is of paramount importance and in which all superfluous weight must therefore be eliminated.

Calculations necessary in the design of engines form the backbone of the text of a book entitled *Mechanics of the Gasoline Engine*, by H. A. Huebotter, M.E., recently published by the McGraw-Hill Book Co. Only brief reference is made to the thermodynamics of the engine, but the working stresses in each part are analyzed and rules for the determination of the various dimensions are given.

A valuable feature of the work are illustrations showing a variety of designs of each part discussed. The following list of chapter heads will give a good idea of the scope of the work: Fundamental Principles; Engine Power and Efficiency; The Crank Chain; The Cylinder; The Piston Assembly; The Connecting Rod; The Crankshaft; Valves and Valve Mechanism; The Flywheel; The Crankcase; Engine Balance; Lubrication; The Governor; Water Cooling; Air Cooling; Inlet and Exhaust Manifolds.

At the end of each chapter is given a brief review of the main points brought out in the chapter, evidently to facilitate the use of the book as a work of reference.

PRACTICAL information concerning cost accounting methods and procedure comprises a large part of the 1922 Year Book of the National Association of Cost Accountants. In addition to material concerning the society itself, the volume contains discussions of actual costs as compared with replacement costs; sales and administrative costs, standards as a means of reducing costs; budget control; and the place of costs in management.



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## Unmasking the Oil Famine Bugaboo

ONLY two or three years ago there was a constant and insistent din that an oil famine was creeping constantly closer and closer. We were led to believe that the situation was so serious lubricants should almost be measured out with a medicine dropper and that unless some substitute were found for gasoline as a fuel for internal combustion engines, all automobiles soon would stop running. We even were given estimates of how many barrels of oil remained under the earth's surface.

Now comes along H. A. Haring in the New York *Times Annalist* with an article captioned, "The Oil Industry Unmasked." Mr. Haring certainly is an iconoclast.

"No human being, no geologist and no statistician can do more than make a wild hazard as to the amount of oil in store within the earth," he says. "All their calculations of the past have been regularly shot to pieces by the explosive shots at the bottom of thousands of feet of steel pipe which usher in the new 'gusher,' each new one adding to the continual outflow from the existing wells."

But this isn't all. Taking as his text the tremendous over-production of 1923 he declares:

"Despite all the vociferation about impending oil

shortage, no shortage has ever occurred. Recurrent periods of over-production have, on the other hand, been characteristic of the industry. . . . It is well to remember that few of our oil fields have dried up. Although they have passed their spectacular and bonanza days, the old fields continue to pump to their pipeline connections, day and night, without cessation. Western Pennsylvania, the original field of 64 years ago, continues to give forth the peculiar odor of flowing wells and, as a matter of fact, the production in barrels exceeds that of the romantic years of fifty and sixty years ago.

"The fundamental fact, the underlying condition, of the American oil industry is that our wells are capable of production vastly beyond what the country has ever used. Instead of impending oil famine, the United States has ahead of it a continuation of oil over-production."

To all of which iconoclastic views the automotive industry probably will utter a hearty amen. It will not soon forget the way in which the users of its products have been gouged on gasoline while the wail has gone up that we must conserve our oil resources to save the nation's life in the grim days of war as well as in the piping times of peace.

## Somewhat Exaggerated Optimism

"CAN every family have a car?" is a question asked in the current issue of *Collier's*. The article quotes several economists pro and con and then says:

"There are today from five to six million families in the United States who want cars badly. They are saving and skimping to get them. They want cars more than they want silk shirts, pianos, books, the theaters, or even sirloin steak. It is probable that between two and three millions of these families will buy cars this year. Add those to the two million replacements and there goes another record—four and a half to five million new cars in 1924, our biggest automobile year!"

We are thoroughly in accord with the premise but not with the conclusion. There undoubtedly are five or six million families who would rather have a car than any other piece of merchandise, but we strongly doubt that between two and three million of them, or approximately half, will be able to come into the market this year as first buyers of new cars.

It is probable that not far from 13,000,000 passenger cars are registered now. Assuming that all present owners continue to be motorists and that 1924 produced 3,000,000 additional buyers, we should have a registration of something like 16,000,000. This would leave only about 4,000,000 families in the country which do not own motor cars. We don't believe we will come that close to the theoretical saturation point within the next twelve months.

With serviceable used cars so plentiful at any price from \$25 up, there are no economic obstacles in the way of their purchase by almost everyone. The rub come on operating and maintenance costs and garage charges. The last is the most important. Until some means are found for sharply reducing garage rentals in large centers of population there always will be several million urban families who will have to do



without automobiles. There will be more than 20,000,000 families in the United States when the number of passenger cars reaches 20,000,000 some time around 1930.

We sincerely hope automobile sales will run from 4,500,000 to 5,000,000 in 1924 but we wouldn't advise the industry to gamble too heavily on such an eventuality. It should not be overlooked that passenger car production in 1923 was not 4,000,000 but a little less than 3,650,000.

## An Astounding Industry

**S**TATISTICS of the automotive industry become more astounding year by year. Even those most familiar with its growth are amazed when they stop to contemplate the annual aggregate value of its products. Not so long ago we were proud because it had reached the billion dollar mark and now it is nearly five times that, or more than half the total value of all the farm crops raised in the United States. And the farmers have half the purchasing power of the country.

Preliminary figures gathered by the National Automobile Chamber of Commerce for 1923 are peculiarly interesting because they tell of the greatest twelve months in history. Production, which is placed by preliminary estimates at 4,014,000, is 50 per cent over the 2,659,000 vehicles turned out in 1922, the biggest previous year. Trucks accounted for almost exactly 10 per cent of the passenger car total or 370,000.

Total wholesale value of cars and trucks is placed at \$2,510,885,000 and here again approximately ten per cent, or \$267,500,000, goes to trucks. The average retail selling price of passenger cars is estimated at \$811 and of trucks at \$1,080.

Compared with the wholesale value of cars and trucks in 1922, as estimated by the N. A. C. C., this shows a gain of \$721,247,000 or 29 per cent in dollar value of units produced as against an increase of 50 per cent in number. This indicates a somewhat smaller profit per unit, as the percentages of total production by individual companies did not change materially.

Value of cars and trucks is only 55 per cent of the total for the industry, however, according to these figures, for the total wholesale value of parts and accessories is given as \$1,310,000,000 and of tires as \$760,000,000, making a total of \$2,070,000,000 and a grand total of \$4,580,885,000.

Wholesale value of tires, parts and accessories for 1922 was estimated at \$1,751,000,000, showing a gain of 18 per cent. This would indicate a somewhat smaller margin of profit for manufacturers in this field.

Estimating distributor and dealer discount at 25 per cent of the wholesale value of cars and trucks, retail sales organizations received nearly \$628,000,000 for disposing of the vehicles made last year, assuming that all of them were sold. The N. A. C. C. estimates that there are about 43,000 car and truck dealers in the United States and their average gross profit, therefore, would have been \$14,600. It should

not be forgotten, however, that there is a vast difference between a dealer's gross and his net profit.

These figures are not assumed to be entirely accurate and they are subject to revision, but they give an approximation of the magnitude of the industry.

## Ford Will Make Steel in New Way

**D**IRECT production of steel from iron ore in one continuous process has long been a dream of metallurgists. Something over two years ago a considerable stir was caused in European steel circles by the announcement that a French metallurgist, Basset, had developed such a process and that a company had been formed to work it on a large scale. Reductions in the cost of plant, fuel and labor were claimed, and the overall cost of production was said to be only 50 per cent that of the standard method. Critics of some competence held these claims exaggerated, however.

The Basset system is not the only one of its kind, however, and the Ford Motor Co. will test at its River Rouge plant the Bourcoud process for the direct production of steel. This process involves four separate stages. As in the Basset process, powdered fuel is used, and the first stage consists of the gasification of this fuel. In the second stage the iron ore is reduced by the gases thus formed; the iron sponge produced is charged into an electric furnace and the slag removed in the third stage, while in the fourth the steel is further refined if necessary. The material thus never gets cold from the time the ore is first heated, hence there should be a saving in fuel. Waste heat, moreover, is expected to furnish all of the power required for working the process.

Any reduction in the cost of making steel which may thus be effected is, of course, of less importance in automobile manufacture than in railroad building, ship building and structural work of all kinds, for the reason that most of the steels used in automobile manufacture are alloys which require the admixture with the primary steel of expensive ferrous alloys, whereby the cost is greatly increased. Any definite saving in the refining process, therefore, would constitute a much smaller percentage of the cost of production. This, however, does not apply to the rather large quantities of sheet metal used in all cars. In any case, we have reached a stage where progress in manufacture and in the reduction of costs can be made only in short steps, and if Ford succeeds in lowering the cost of his steel he will have fortified himself further against competition.

**R**EPRESENTATIVES of all branches of the industry will hold formal or informal meetings, luncheons and dinners, or all three the week of the New York show, to discuss common problems of their own or of the industry. Many of the gatherings will bring together manufacturers, jobbers and distributors for frank discussions. Differences and difficulties will be ironed out to the mutual advantage of all. The big show next week will be more than ever a convention of the industry and New York will be the real center of the motor industry.

## DECEMBER SALES EXCEEDED YEAR AGO

**T**HE month of December has witnessed some falling off in sales from the previous months, business in the various districts ranging from dull to brisk. In almost all cases, however, the sales have been above last year for the same period.

Used cars are stocking up seriously in some of the large cities and occasionally in the smaller cities, but throughout the country stocks appear to be normal or somewhat low.

There are some indications of increased credit difficulties with the individual buyer, but these are scattered.

Raw materials moved up slightly during the month, but are substantially less than general commodity prices.

Stocks are still below the general industrial index but are moving toward a parity.

Strong features are:

- (1) Continued good sales in spite of falling off.
- (2) Orders for future delivery look good so far as volume is concerned.

(3) Raw materials are in a favorable position for the automotive manufacturer.

(4) Country districts report normal or subnormal condition of stocks.

The weak features are:

(1) Increasing stocks of used cars in some of the larger centers and particularly the difficulties in obtaining reasonable prices for those sold.

(2) Some increase in credit difficulties on time sales.

Commercial vehicles show a general normal sales condition. Some districts report a drop and others a considerable increase in this type of vehicle. Outlook for next year shows good probability of sales for the early months.

In general the immediate outlook is good. The early months of the year are expected to equal, if not surpass, 1923.

Conditions in chief distributing centers as reported by correspondents of AUTOMOTIVE INDUSTRIES are as follows:

## Open Weather Has Been Factor in Keeping Up Sales

### Detroit

DETROIT, Jan. 2.—Sales of new cars in Detroit in the month of January are expected to run 5 per cent ahead of the same month last year when sales totaled 2746. Business has been running 50 per cent better each month in this city and is expected to continue to improve at this rate. January sales last year, though way ahead of the year before, were far below the monthly totals.

As a result of the general optimistic spirit among dealers on spring business, stocking of new cars is now going forward at a rapid pace and they are taking all the cars they can lay hands on.

The used car situation has changed greatly for the better during the past month due in large part to the open weather, and also to the fact that dealers have taken losses to make prices attractive to buyers. Right now the general used car condition in the city is declared better than at the same time a year ago, so that dealers have a splendid opportunity for sales with the turn of the year. A continuance of open weather will help immensely.

In the industrial cities of the State the situation is akin to that of Detroit. In the agricultural districts sales have been better than usual due to open weather.

### San Francisco

SAN FRANCISCO, Jan. 2.—Automobile and truck dealers, accessory men and repairshop operators are looking forward to the best year they ever had in California. Used car dealers are in the same position, and tire men throughout the northern part of the State are increasing stocks to meet the demand.

Reasons back of this optimism are the immigration to California of more than 20,000 families or approximately 75,000 individuals last year to become residents of the State and the unprecedented wave of automotive buying which, starting in October, had not reached its peak at the end of December.

Two big shows, one in Oakland in January and the other in San Francisco in February, will present new models to the public at about the same time that they are presented in the East.

Increase in construction of paved highways throughout the State and the improvement of those already built are other factors in the increase of business promised for 1924. While figures on December sales are not yet available, it is certain that they will exceed those of any previous December and probably will show considerable gain over any month of 1923.

There is a manifest tendency on the part of dealers in cars, priced from \$1,000 to \$2,500, to stock up to the full extent of their space.

### St. Louis

ST. LOUIS, Jan. 2.—With the sale of new cars about 15 per cent above normal and the stock of used cars on hand below normal and taken in at closer figures than ever before, distributors in St. Louis face the new year in an optimistic mood. It is expected that the demand for cars will be excellent for the immediate future and it is believed will be good into the month of July.

An increase in buying is looked for in the rural districts. A good indication is found in the excellent condition of accounts for re-possession, due to failure to meet notes.

### Milwaukee

MILWAUKEE, WIS., Jan. 2.—Milwaukee dealers made more deliveries of passenger cars in December than in any corresponding month on record, and so far as it is possible to determine, sales fell only slightly below the November volume.

Some Milwaukee dealers are carrying unfilled orders into the new year. This, however, refers mainly to the most popular closed types, the scarcity of which has not been fully relieved. Dealers have been doing considerable stocking of phaeton and roadster types for several weeks in preparation for an active business which is expected to set in during and after the annual show, Jan. 19-26. In the meantime the expectance is for a moderately good demand, without the sharp vacuum usually noted between the early part of December and show time.

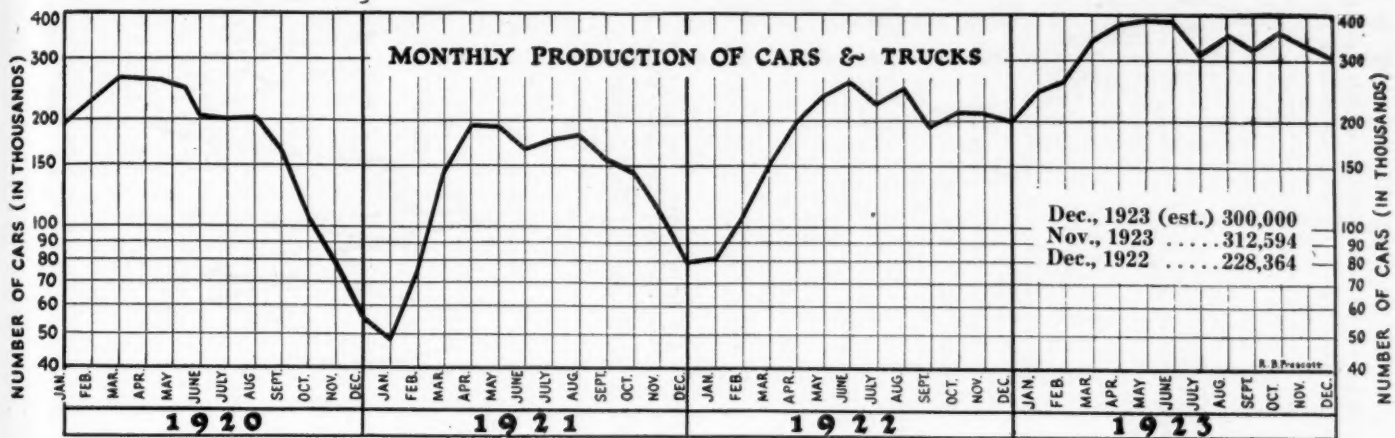
Without considering the expressions of the more enthusiastic, it may be said that the outlook for spring trade is very good and at least as good as it was a year ago today. The general business situation at present is one of recovery from an inclination toward caution that became noticeable shortly after the middle of the year.

While comment on the used car situation is difficult to elicit, the problem is a serious one in every aspect. Stocks of used cars are unquestionably the largest ever known, for sales during 1923 involved a preponderance of used cars. Only a few buyers of new cars in a hundred are original buyers. The classified columns of Milwaukee newspapers, as in other cities, contain an enormous number of used car offerings.

(Other conditions on page 39)



## MONTH'S OUTPUT APPROXIMATED 300,000



### 4,009,320 Estimated as Total Production for All of Last Year

NEW YORK, Jan. 2—Estimates made by the National Automobile Chamber of Commerce, based on shipping returns, place December production at approximately 300,000 cars and trucks, a decrease of 4 per cent over the preceding month.

This gives a total for the twelve months of 1923 of 4,009,320, which may be increased a few thousands when the figures are revised. Compared with the total output of 1922 of 2,586,049, this is an increase of approximately 50 per cent, the biggest jump in the history of the industry. In dollars and cents the wholesale value of 1923's production of cars and trucks amounts to \$2,510,885,000. The wholesale value of the cars is \$2,243,500,000 and of the trucks \$257,500,000.

#### New Record in Values

This in itself is a new record, surpassing the previous best mark of \$2,232,927,628 in 1920, when 2,205,197 motor vehicles were turned out. This is evidence backing up the claim of the N. A. C. C. that the automobile dollar is worth 111 cents and illustrates the substantial price reductions the industry has made in the last three years. In 1921 the wholesale valuation was \$1,260,000,000 and in 1922 \$1,789,638,365.

Passenger car production in 1923 was approximately 3,632,090, which exceeds by a big margin the predictions of a year ago as to the combined output of cars and trucks for the year just ended. In 1922 the passenger car output numbered 1,691,368.

Trucks had a good year with an esti-

### Decrease in Production Last Month as Compared with November Was 4 Per Cent, According to Estimates

NEW YORK, Jan. 2—Shipping figures compiled by the National Automobile Chamber of Commerce for December give an estimated production of approximately 300,000 cars and trucks. This is a decrease of 4 per cent from November. Estimated total production for the twelve months is given as 4,009,000.

The following table presents the statistics for the twelve months of 1923 and 1922.

	Output		Carloads		Driveaways		Boat	
	1923	1922	1923	1922	1923	1922	1923	1922
January .....	243,539	91,272	35,228	15,357	30,031	7,479	728	143
February ...	276,934	122,521	36,165	19,636	43,613	10,173	882	180
March .....	355,030	172,984	44,983	27,753	62,983	16,917	1,908	560
April .....	382,695	219,864	46,095	31,334	60,467	21,381	5,027	2,960
May .....	394,088	256,569	45,339	33,416	62,210	28,827	12,812	7,406
June .....	378,507	289,351	40,550	34,230	58,761	33,857	13,418	7,737
July .....	327,993	247,132	32,426	29,116	46,511	28,100	10,049	7,030
August .....	345,202	274,184	37,770	32,817	50,460	36,768	8,800	10,104
September ..	327,549	207,156	36,885	25,950	37,400	30,055	8,500	8,002
October .....	365,189	239,361	41,700	26,980	39,200	33,320	8,000	7,040
November ...	312,594	237,301	39,850	27,232	29,100	27,376	7,000	5,070
December ...	300,000	228,364	.....	.....	.....	.....	.....	.....

Motor vehicle production segregated as to cars and trucks is as follows:

	1922			1923	
	Cars	Trucks		Cars	Trucks
January .....	81,696	9,576	January .....	223,819	19,720
February .....	109,171	13,350	February .....	254,773	22,161
March .....	152,962	20,022	March .....	319,770	35,260
April .....	197,224	22,640	April .....	344,639	38,056
May .....	232,462	24,097	May .....	350,410	43,678
June .....	263,053	26,298	June .....	337,362	41,145
July .....	225,086	22,046	July .....	297,330	30,663
August .....	249,482	24,692	August .....	314,373	30,829
September .....	187,694	19,462	September .....	298,911	28,638
October .....	217,566	21,795	October .....	335,023	30,166
November .....	215,352	21,949	November .....	264,680	27,914
December .....	208,010	20,354	*December .....	271,000	29,000

\* Estimated.

mated production of 377,230 as compared with 252,668 in 1922.

There was an increase of 5 per cent in closed cars.

#### HOUSE AND CAR DEMAND

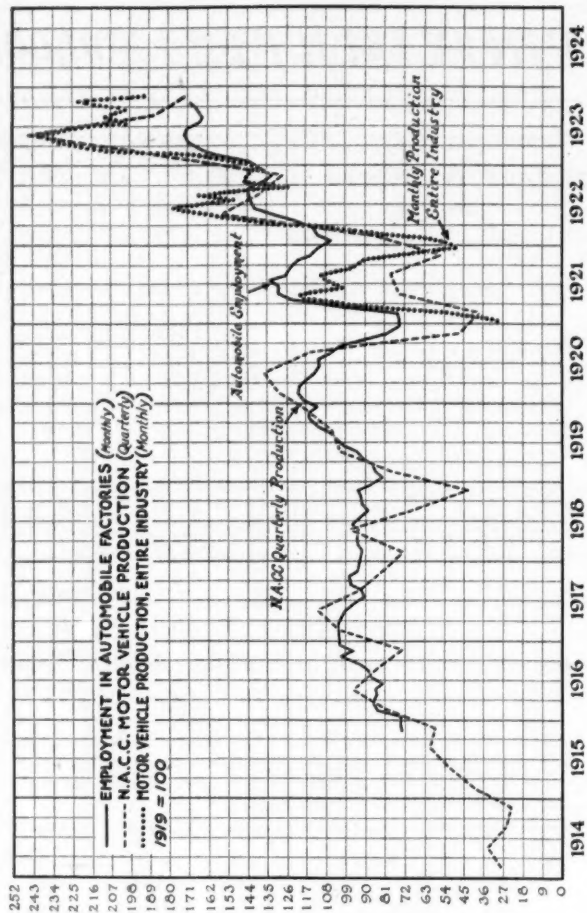
WASHINGTON, Jan. 2—An exceptionally heavy demand for houses and automobiles is one of the outstanding features of the industrial life of the country during the past year, the Fed-

eral Reserve Board states in a review, just made, of business developments during the year 1923.

A general increase of 13 per cent over the 1922 levels were shown during the year in both industrial employment and department store sales, while the total value of agricultural products advanced \$900,000,000 and the railroads, with improved facilities, carried the largest traffic in history. Farmers, the board finds, are exceedingly prosperous.

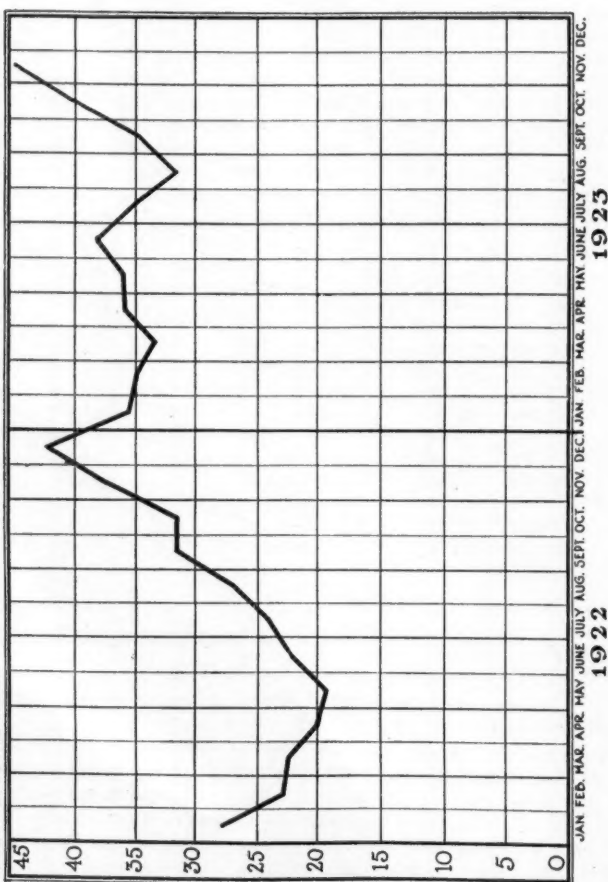
### Automobile Employment Fluctuates with Output

Seasonal Peak in Employment Reached in Early Summer, Falling off Towards End of Year

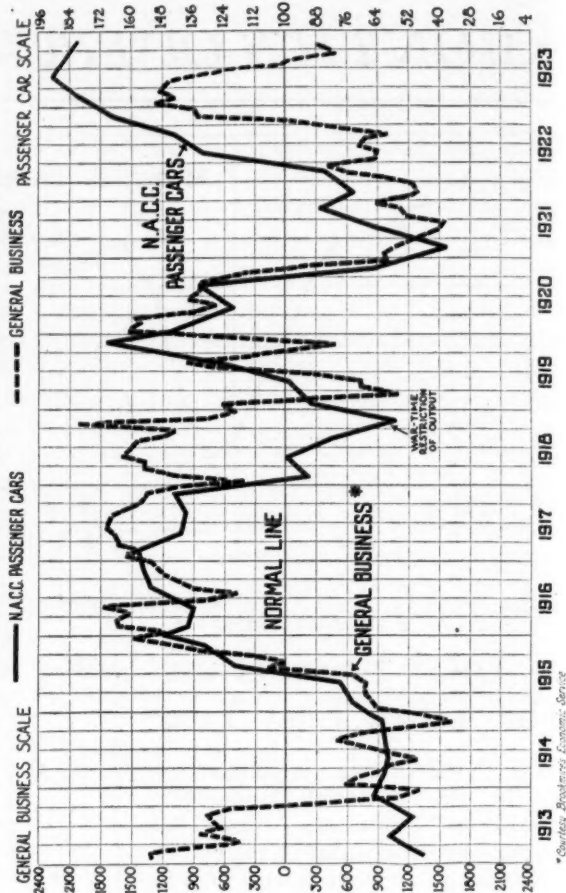


### N. A. C. C. Closed Car Percentage Considerably Higher Than Last Year

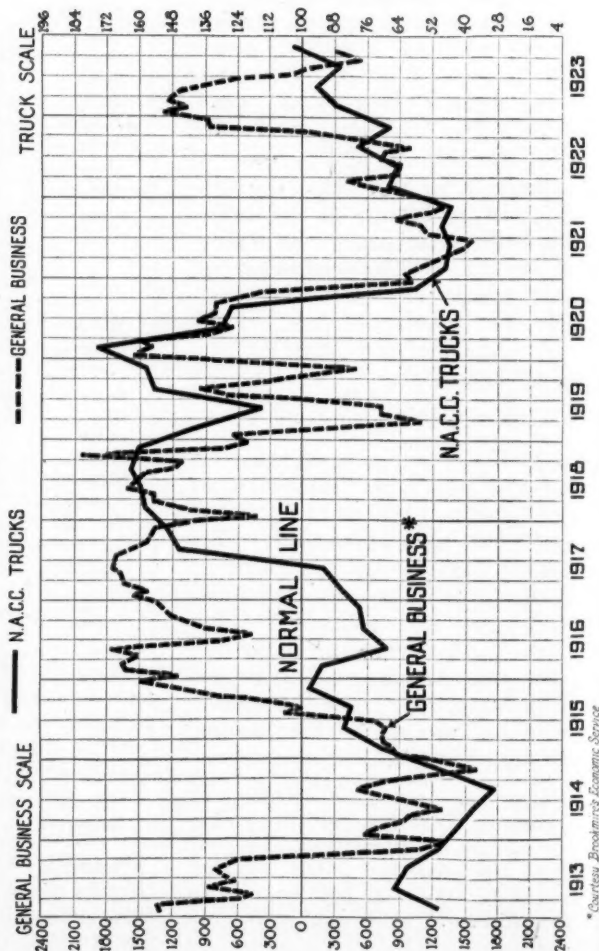
Seasonal Trend Upward in Last Half of Year



### N.A.C.C. PASSENGER CAR PRODUCTION COMPARED WITH BROOKMIRE'S GENERAL BUSINESS CURVE



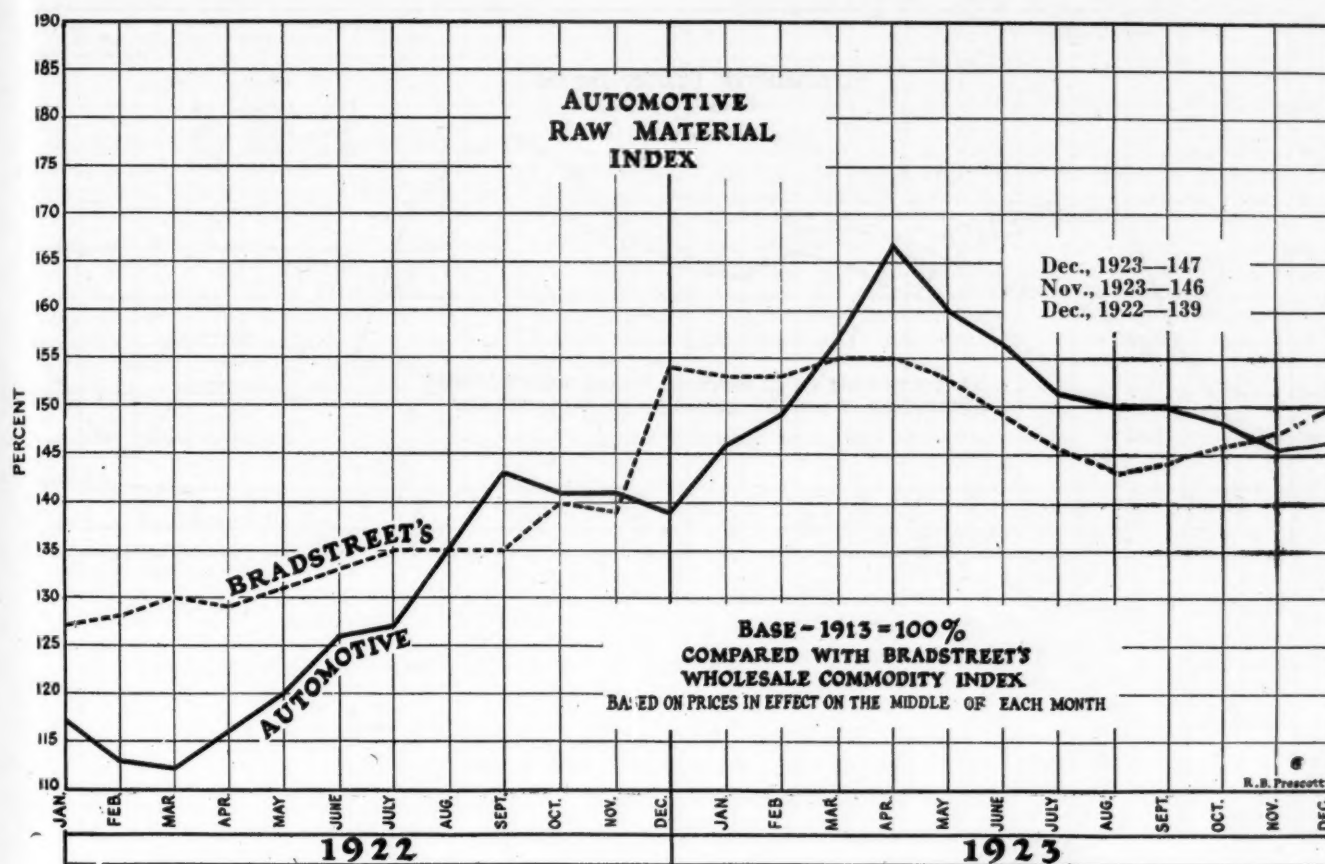
### N.A.C.C. TRUCK OUTPUT AND GENERAL BUSINESS COMPARED



\*Courtesy Brookmire Economic Service



## MATERIAL COSTS ADVANCE SLIGHTLY



## Local Conditions Encourage Optimism Among Dealers

### Toledo

TOLEDO, Jan. 2—December showed a slight decrease in automobile sales in Toledo territory, but on the whole there was much better buying than a year ago. While the big Christmas buying in retail stores had a tendency to deaden efforts of automobile salesmen temporarily, it is taken as a barometer of the good business to come; dealers are looking forward to a big business following the show period. They are not pressed yet for storage of cars by factories, but are absorbing some in anticipation of needs.

Farmers are in a much better condition than they themselves think, according to the dealers here, and they will furnish a big share of the new business. Labor is employed in the district, and factory schedules all call for about 30 per cent increase in production for 1924.

All these factors make local dealers exceptionally optimistic, and several declared they looked for the best year in the history of the business. Most confine their estimates to first six months of the year.

In the used car business Toledo dealers are in good shape with approximately nineteen cars to the dealer in stock. Sales were brisk before Christmas, but

have decreased somewhat since then. A year ago dealers were holding about thirty used cars on the average. The year closing has been most successful for many of the well established dealers. Only a few here have been forced out. Sales as a whole will probably be 50 per cent above best previous year.

### Los Angeles

LOS ANGELES, Jan. 2—Retail automotive selling conditions continued good throughout December, and it is estimated that the month will show a gain of about 20 per cent over the same period last year. Christmas selling was remarkably good, dealers paying more attention to the giving of automotive presents propaganda than ever before.

The used car situation is not alarming, although practically every dealer is heavily stocked with cars. There has been no indication of price reductions, but while the market remains stable in this respect, longer terms of payment are permitted.

The optimistic spirit of dealers is evidenced in the enlargement of buildings and extension of the local sub-dealer plan. No thought is being given now to spring prospects.

### Kansas City

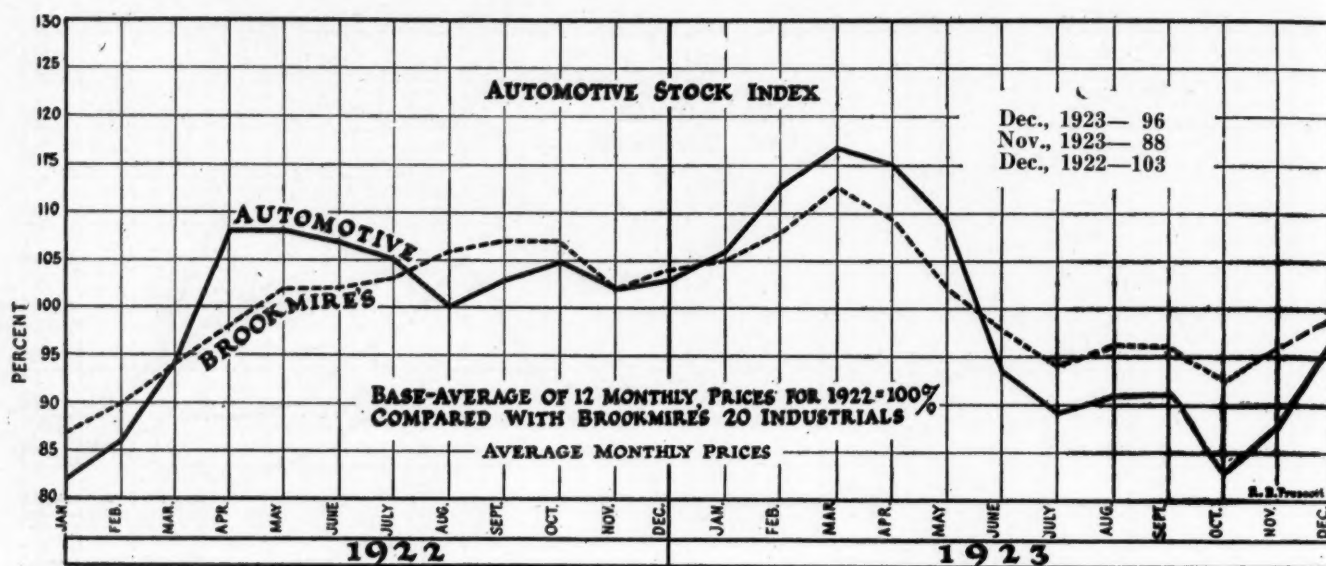
KANSAS CITY, MO., Jan. 2—December opened with hopes, but these were not fully realized in sales of new or used passenger cars or trucks. The truck trade particularly was small in December. Passenger car sales were more spotty than usual, with only a few lines showing satisfactory volume.

The lower priced cars were markedly slower, some dealers making only two or three sales during the month. The motor car trade, however, has been on a par with other businesses, men's wear and department stores having only a fair volume even in the rush of Christmas shopping and not enough to make up for previous deficiencies. During the fall and winter Christmas purchases were in small units.

It is noted that motor car dealers, having efficient service departments on a business-like accounting basis, are less concerned over slight sales of cars than are others. Dealers report that the general tone of conditions is better than in the first of December, salesmen being confident that prospects are really going to buy.

(Conditions in other cities on pages 50 and 51)

# AUTOMOTIVE STOCKS SHOW UP TREND



## New York Exchange

	Nov. 5	Dec. 4	Dec. 31
Ajax Rubber .....	6	7 1/2	6 1/4
American Bosch .....	27	33	35 1/2
American La France .....	11	11 1/2	10 3/4
American La France pfd. ....	93	91	91
Case, J. I. ....	20	18	22 1/2
Case, pfd. J. I. ....	66	66	68
Chandler .....	48	54	66 1/4
Continental Motors .....	6 3/4	7	6 3/4
Eaton Axle & Spring .....	23	24 1/2	23 1/2
Electric Storage Battery ..	61 1/4	65	60
Emerson-Brantingham ....	1 1/4	3/4	1 1/4
Emerson-Brantingham pfd ..	14	6 1/2	8
Fisher Body .....	158	158	165
Fisher Body of Ohio .....	98	98	97
Fisk Tire .....	6 3/4	7 1/4	8
Gardner Motor .....	6 3/4	6 1/2	5 7/8
General Motors .....	14 1/4	13 1/4	15
General Motors pfd. ....	79	81 1/2	81
General Motors 6% .....	80	81 1/2	80 1/2
General Motors 7% .....	95	96	98 1/2
Goodrich, B. F. ....	19 1/2	22 1/2	22
Goodrich, pfd., B. F. ....	75 1/2	74 1/4	72
Goodyear Tire pfd. ....	25 3/4	41	39 3/4
Goodyear Tire pr. pfd. ....	90	90 5/8	88 1/4
Gray & Davis .....	7	7 1/2	7 3/4
Hayes Wheel .....	35	37 1/4	40
Hendee Mfg. ....	17	18 3/4	....
Hudson .....	24	26 1/4	27 3/4
Hupp .....	17	22 1/2	15 3/4
Inter. Harvester .....	75	76 3/4	77 1/2
Inter. Harvester pfd. ....	106 1/4	105 3/4	106 1/2
Kelly-S Tire .....	24 3/4	31 3/4	32 1/4
Kelly-S Tire 6% pfd. ....	70	73	75
Kelly-S Tire 8% pfd. ....	70	84	85
Kelsey Wheel .....	87	88	96
Kelsey Wheel pfd. ....	99 1/2	101	103
Keystone Tire .....	2 1/2	3	3 1/4
Lee Rubber .....	13	14	14
Mack Truck .....	75 5/8	84	90 1/4
Mack Truck 1st pfd. ....	85	93 1/2	95 1/2
Mack Truck 2nd pfd. ....	82	87	88
Marlin-Rockwell .....	3	6	7 3/4
Martin-Parry .....	28 3/4	30 3/4	35 3/4
Maxwell Motors A. ....	42 1/4	47	49 1/2
Maxwell Motors B. ....	12 3/4	12 3/4	13 1/2
Moon Motors .....	21 1/2	25 1/4	25
Mullins Body .....	14	13 1/2	12 3/4
Mullins Body pfd. ....	....	89	....
Nash Motors .....	86	90	99
Nash Motors pfd. A. ....	96 1/2	97 1/2	97
Ohio Body & Blower .....	2	1 1/2	2 1/4
Packard .....	11 1/2	12	12 1/2
Packard pfd. ....	93	91 1/2	92 1/2
Parish & Bingham .....	10	11 1/2	13 1/4
Pierce-Arrow .....	8	8 3/4	8 3/4
Pierce-Arrow pfd. ....	19 1/2	24	26
Pierce-Arrow pr. pfd. ....	60	63 3/4	62 1/2

Reynolds Spring .....	19	24	20 3/4
Spicer Mfg. ....	13 1/2	14	15 1/2
Spicer Mfg. pfd. ....	88	85	88
Stewart-Warner .....	92 5/8	88 3/4	91 1/4
Stromberg Carbureter .....	67 1/2	85	79 1/2
Studebaker .....	101 1/4	104	106 1/2
Studebaker pfd. ....	117	115	115
Timken Roller Bearing .....	35 3/4	37 1/4	39 1/4
U. S. Rubber .....	35	38 1/2	37 1/2
U. S. Rubber 1st pfd. ....	86	89 1/2	89 1/2
White Motor .....	49	51 1/2	55 1/4
Willys-Overland .....	7 3/4	7 3/4	10 5/8
Willys-Overland pfd. ....	73 1/2	71 1/2	82
Wright Aero .....	10 3/4	12 3/4	13

## Cleveland

	Nov. 5	Dec. 4	Dec. 31
Eaton Axle & Spring .....	22	24	....
Firestone .....	63 1/2	65	68
Firestone 6% pfd. ....	85 1/4	92	90
Firestone 7% pfd. ....	....	90 1/2	88
Goodrich pfd. ....	....	....	....
Goodyear .....	8 3/4	9 1/4	8 3/4
Goodyear pfd. ....	35 1/2	40	....
Jordan pfd. ....	200	260	....
McGraw Tire .....	1 1/2	1 1/2	....
McGraw Tire pfd. ....	3 1/2	3 1/2	....
Miller Rubber .....	....	66	....
Miller Rubber pfd. ....	88	89	....
Peerless Motors .....	27 3/4	29	23
Sparks-Withington .....	20	23	....
Stearns, F. B. ....	17	19 1/2	....

## Detroit

	Nov. 5	Dec. 4	Dec. 31
Auto Body .....	1	....	....
Bower Roller Bearing .....	8 1/2	....	....
Columbia Motors .....	1 1/4	....	1 1/2
Continental Motors .....	6 1/2	7 1/4	6 3/4
Edmunds & Jones .....	35	35	....
Federal Truck .....	23	19	....
Ford of Canada .....	403	392	422
Hayes Mfg. ....	1 1/2	1 1/2	1 1/2
Hoover Steel Ball .....	11	10	....
Motor Products .....	154 1/2	165	....
Motor Wheel .....	....	10	....
Packard com. ....	10 3/4	12 1/4	12 3/4
Packard pfd. ....	92 1/2	91 1/2	92 1/2
Palge .....	18 3/4	22 3/4	15 3/4
Reo .....	16 3/4	17 3/4	17 1/4
Timken-D Axle com. ....	6 3/4	7 1/4	7
Timken-D Axle pfd. ....	80	....	....

## Boston

	Nov. 5	Dec. 4	Dec. 31
Gray & Davis .....	7	7 1/2	7 3/4
Greenfield Tap & Die .....	....	15	....
Hood Rubber .....	....	53	53
Parish & Bingham .....	....	12	....
Simms Magneto .....	....	1 1/2	....

## New York Curb

	Nov. 5	Dec. 4	Dec. 31
Aluminum Manufactures ..	23	25	....
Cleveland Motors .....	22 1/2	21	....
Cleveland Motors pfd. ....	85	....	....
Columbia Motors .....	....	....	50
Dort .....	2 3/4	2 1/4	....
duPont Motor .....	4	3	....
Durant Motors .....	29 3/4	25	35
Durant Motors of Ind. ....	8 1/4	7 3/4	10 1/2
Firestone Tire .....	....	....	....
Ford of Canada .....	395	391	....
Goodyear Tire .....	8 3/4	9	9
Hudson .....	....	24	....
Hupp .....	....	17	....
Kelsey Motor .....	....	1 1/2	....
Motor Products .....	23	38	38 1/2
Motor Products pfd. ....	42 1/2	44 1/2	47 1/4
Motor Wheel .....	8 1/2	9 1/2	....
National Motors .....	....	....	....
Palge-Detroit .....	19	....	....
Peerless Motors .....	27	28	24
Perfection Tire & Rubber ..	70	....	....
Reo .....	16 3/4	17 3/4	....
Roamer Motor .....	....	5	....
Stutz .....	10 3/4	9	9 1/2
Timken-D Axle .....	6 1/4	7	6 1/2
Willys Corp. 1st pfd. ....	3	5 1/4	9 3/4

## Chicago

	Nov. 5	Dec. 4	Dec. 31
Bassick Alemitte .....	32 3/4	36 1/4	36
Borg & Beck .....	26 1/2	....	....
Chicago Coach .....	180	....	....
Chicago Coach pfd. ....	90	90 1/4	88
Continental Motors .....	6 1/2	7 1/4	6 3/4
Earl Motors .....	....	....	....
Eaton Axle & Spring .....	....	....	....
Gill Mfg. ....	18	18 1/2	18 3/4
Hayes Wheel .....	....	38 1/4	....
Hupp .....	17	22 3/4	17 1/4
McQuay-Norris .....	....	19 3/4	....
McCord .....	33	....	....
Reo .....	16 3/4	17 3/4	17 1/4
Reynolds Spring .....	....	25	....
Stewart-Warner .....	78 3/4	88 1/2	91
Yellow Mfg. ....	93	96 1/2	95

## Philadelphia

	Nov. 5	Dec. 4	Dec. 31
Electric Storage Battery ..	61 1/2	65 1/2	....



## Day at Meeting Set for Motor Questions

### Five Major Topics Listed to Be Discussed at National Trans- port Conference

WASHINGTON, Jan. 2.—Consideration of the relation of highways and motor transport to other transportation agencies will be one of the major problems of the national conference on transportation, called to meet here on Jan. 9, 10 and 11, and will be taken up for consideration on the second day, Thursday, of the meeting.

Briefly the program to be laid before the delegates opens up for discussion five questions of importance to the future of motor transport and its relation to other transportation agencies. These are:

- (1) The role of the motor truck within the terminal area.
- (2) The role of the motor truck outside the terminal area.
- (3) Passenger transportation.
- (4) Relation of motor transport to highway development.
- (5) Regulation of motor carriers.

Under each of the five named major topics will be included various phases of the truck problems, chief among which will be the question of store-door service, short hauls, storage, street congestion, freight interchange between railroads and substation service, freight transportation, the need for motor transport regulation, size, weight and speed restrictions.

#### Swayne to Submit Report

The committee's special report will be presented to the 200 or more delegates by Alfred H. Swayne, chairman of the committee, who is also the National Automobile Chamber of Commerce's representative in the United States Chamber of Commerce. Following the presentation of the report, an open discussion on it will be made.

Members of the committee are hopeful that something tangible can come out of the meeting and that some action, probably in the form of a resolution, or set of resolutions, will be taken which will afford a working basis to help solve the multiplicity of problems in highways and motor transportation.

The full program of the conference, which will be held at the New Willard Hotel, is as follows:

#### WEDNESDAY, JAN. 9

Morning Session, 10.30 A.M. to 1.00 P.M.  
Luncheon, 1.00 P.M.

Afternoon Session, 2.15 to 5.30 P.M.

Introduction: Julius H. Barnes, president, United States Chamber of Commerce.

Address: Hon. Herbert Hoover, Secretary of Commerce.

Organization of the conference and appointment of the resolutions committee.

"Governmental Relations to Railroad Transportation" and presentation of Report

## Good Year of Automobile Sales Indicated by Present Condition of Business Throughout Country

AN INTERVIEW WITH F. A. WADE,  
General Purchasing Agent of the Studebaker Corp.

By D. M. McDonald,  
Detroit News Representative of the Class Journal Co.

Detroit, Jan. 2.

**T**HE industry generally is confident of larger business in 1924 than even in the phenomenal year through which it has just gone, according to F. A. Wade, general purchasing agent of the Studebaker Corp. of America, and is preparing itself on that basis.

Despite the fact that more automobiles were sold in 1923 than in any one year previously, the general business condition of the country is so good, and the preference by the public for automobiles so pronounced, that industry leaders can see no reason why sales should not reach higher totals than in the previous year.

In the general note of confidence on the security of the year's business, the industry, however, has recognized that factors may develop which will have a limiting effect and for that reason has made and will make its commitments for material on a self-protecting basis.

Studebaker for the last few years, Mr. Wade said, has pursued the policy of ordering its material on a basis of thirty-day requirements. Actual production for the forthcoming month determines the material that is to be bought, and the supply sources are given definite orders on the 25th of each month for deliveries that are to be made. The supplier has the benefit of an estimate of requirements that is furnished sixty days in advance, this giving him an opportunity to make preparations for the probable order that will be filed and possibly to get several days of production ahead. By reserving the actual order, however, until just before the goods are required, there is little possibility of a store of manufactured stock being acquired by either party.

Studebaker has not carried any stock of materials for several years, declared Mr. Wade, and has placed itself in a position where it can dispose of all stock within three months should sudden emergencies arise.

To create a condition whereby manufacturing operations could be carried on without interruption, Studebaker has carefully developed its supply sources. Before placing orders with any supplier, the company has established the policy of personally investigating it, its equipment and financial standing, so that there will be no question of its ability to perform any contract that may be awarded.

No shortages in any particular field are foreseen by Mr. Wade in the forthcoming year, regardless of the extent of business, although he declares it will be several years before the industry will be getting all the closed bodies it requires. The final development in the body field will find the industry manufacturing 75 per cent of its output in closed bodies. Until it is organized to produce on that basis it will be a matter of manufacturing all the closed cars possible and the remainder in open models.

Better manufacturing methods and changes in design will bring closed body prices ultimately much lower than they are today. It is unquestioned that public taste today is for closed cars and that this will become more pronounced as driving experience grows.

Plate glass will continue to present one of the most difficult problems that the industry has to meet, despite large expansion by manufacturers in that field. The building industry will continue to take enormous quantities of glass, according to present outlook in this field, and the automobile industry will require larger supplies as closed car production is increased. A falling off in steel prices is looked for by Mr. Wade sometime around Feb. 1.

of Committee on Governmental Relations to Railroad Transportation by George A. Post, chairman, followed by open discussion.

"Railroad Consolidation" and presentation of the report of the Railroad Consolidation Committee by Chairman Carl R. Gray, to be followed by open discussion.

"Readjustment of Relative Freight Rate Schedules" and presentation of the committee's report by Frederic A. Delano, chairman, to be followed by discussion.

#### THURSDAY, JAN. 10

Morning Session, 9.30 A.M. to 1.00 P.M.  
Luncheon, 1.00 P.M.

Afternoon Session, 2.15 to 5.30 P.M.

"Relation of Highways and Motor Transport to Other Transportation Agencies," and presentation of the committee's re-

port by Alfred H. Swayne, chairman, followed by open discussion.

"Taxation of Transportation Agencies" and presentation of report of joint subcommittee by George A. Post, chairman, followed by discussion.

"Development of Waterways and Coordination of Rail and Waterway Service," and presentation of committee report by W. L. Clause, chairman, followed by discussion.

#### FRIDAY, JAN. 11

Morning Session, 9.30 A.M. to 1.00 P.M.  
Luncheon, 1.00 P.M.

Afternoon Session, 2.15 P.M. to 5.30 P.M.

Completion of general discussion.

Report of resolutions committee.

Consolidation of resolutions and action to be taken by the conference.

## Ternstedt Achieves High Mark in Sales

Total for 1923 Was \$16,094,576  
Compared with \$10,079,377  
in Previous Year

DETROIT, Dec. 29—The fifth annual banquet of the Ternstedt Manufacturing Co. was held this week at the Hotel Statler, in pursuance of the company's policy of building up a feeling of complete accord throughout its organization. The dinner was attended by 437 guests, over 350 of whom were members of the Ternstedt organization, ranking from foremen, through the executive group, to Paul A. Seiler, president and general manager.

Figures on the year's business released at the dinner showed the company to have achieved a sales total of \$16,094,576, which compares with a total of \$10,079,377 in 1922. In 1917 the first year of its existence, the sales total was \$92,750. Since then the company has expanded its manufacturing space from 9000 feet to 824,000, and is now employing 3850 men as compared with fifty-five in the first year. Employees one year ago numbered 2675 and floor space 618,000 feet.

In the one speech of the evening Mr. Seiler noted the company's record of growth, made possible only, he said, by the spirit of cooperation, determination and efficiency of the organization. One of the company's greatest assets, he said, is the youth of its personnel, something that was worth millions of dollars to any company.

### Forecasts No Slowing Up

Commenting on the business outlook in the coming year, Mr. Seiler said there would be more cars built than ever before. There will be no slowing up due to the presidential year, he said, because the country has passed beyond the time when it looked upon slow business as the natural accompaniment of presidential selection. Ternstedt, he said, is looking to the time when it will do a business of \$50,000,000 yearly.

Special guests of Ternstedt at the dinner were department heads and executives of Fisher Body Corp. Old timers of the Ternstedt organization shared the table of honor on which was built a miniature of the original plant No. 1. A series of episodes founded on plant experiences and personalities were given by employees under the direction of W. C. Dandeno. A musical revue was given under the direction of D. B. Miller. T. P. Archer, vice-president and general factory manager, was toastmaster.

### FORMS AIRPLANE COMPANY

MILWAUKEE, WIS., Jan. 2—Lieut. Gilles F. Meisenheimer, for several years conducting the Milwaukee Airport under contract with the Curtiss interests, which expired Dec. 31, has organized the Milwaukee Airplane Co. to build and oper-

## FARM LAND VALUATION LOWERED IN ILLINOIS

SPRINGFIELD, ILL., Jan. 2—Automotive equipment dealers and car agencies shared with the farmers of this State the satisfaction in the announcement that valuations of farm lands in ninety-nine counties had been decreased \$105,894,378, representing a cut of 10.6 per cent from the 1922 figures. With this year's reduction, farm land valuation decreases in three years amount to \$288,130,086.

The decreased valuations mean a lessening of the farmer's tax load and indicate a sweeping return to the pre-war financial status of the agriculturist. More important than these, however, is the manner in which it will strengthen the farmer morale as to his buying power, and the way it will encourage him to further buying. It is this reaction which the automotive corporations are watching most closely and upon which they expect to realize an increased volume of spring business not only in tractors and trucks but cars as well.

ate aircraft on a commercial basis. The new concern has acquired a large building at New Butler, near Milwaukee and close to the airport, to be equipped for assembling and repairing ships and general work on gas engines.

## Owen Now in Production on Stevens-Duryea Car

CHICOPEE FALLS, MASS., Jan. 2—Following the announcement of a proposed auction of tools and machinery by the Stevens-Duryea Motors, Inc., reports published in daily newspapers gave the impression that this was a preliminary step to selling the entire plant of the company, recently acquired by R. M. Owen and his associates, and that the Owen interests had no intention of continuing the manufacture of the Stevens-Duryea car.

President Ralph R. Owens said today:

We are in production on the Stevens-Duryea now and have been for some time and we have no intention of quitting the field. The auction was held for the purpose of disposing of surplus machinery which we did not need following our leasing the Rauch & Lang plant next door, where we will make the Stevens-Duryea cars for ourselves and also build the Rauch & Lang electric for the Rauch & Lang company.

The Rauch & Lang plant is well equipped with machinery itself, so in moving into the new place we naturally found ourselves with more machinery than we needed, and we auctioned off some of the machinery in the old plant that we did not need.

The Stevens-Duryea car is distinctly in the market and will remain there. Sales manager Ray Middleton is building up an efficient plan of distribution and is making many dealer appointments.

## Protection Provided Willys Stockholders

Holding Company Will Handle  
Overland Stock Handed Over  
for Their Benefit

TOLEDO, Jan. 2—Lifting of the receivership of the Willys Corp. is dependent upon the definite settlement of the claims of the Federal government, it was reported to the court here, in connection with the presentation of a readjustment of the affairs of the corporation for protection of the first preferred stockholders.

Under a plan approved jointly by the United States Judge for the southern district of New York and Judge Killits here, a new corporation, to be known as the Landover Holding Corp., will be incorporated to hold the 150,000 shares of common stock of Willys-Overland Co., given for the benefit of preferred stockholders of the Willys Corp. as part of the consideration for the big block of Overland stock purchased from the receivers by Toledo interests last summer.

It is the plan of the new corporation not to market these shares for five years unless ordered otherwise by the courts.

### Will Take Care of Deficit

The company also will have to stand half of any deficit up to \$250,000 that may arise under the receivership, but if there is a surplus the new company will receive it.

The offer of John N. Willys, providing each holder of first preferred Willys Corp. stock with an option to purchase a share of Overland common at \$12 under this plan, is good until Dec. 1, 1926.

Holders of certificates of deposit issued by the stockholders' protective committee will be required to surrender them before Feb. 1, 1924, for shares in the Landover Holding Corp., if they wish to avail themselves of the readjustment plan.

## New Company Gets Plant of Western Drop Forge

INDIANAPOLIS, Dec. 31—The Western Drop Forge Co. plant at Marion, Ind., has been sold by the receiver to a group of Marion business men, who will operate it as the Marion Drop Forge Products Co. The plant will be reopened within thirty days, and W. F. Trabold, who has been manager, will continue in that capacity.

The price paid for the factory, grounds and equipment was \$500,000. This sum included the amount of stock owned by stockholders in the old Western Drop Forge, who are given an equal amount of stock in the new company. The plant is now free of all encumbrances, and the sale has been sanctioned by the court. The directors of the new company are F. W. Trabold, Robert Batton, Mack Wilson, Frederick Davis and Milton Matter.



## New York Stage Set for National Show

Busy Week of Activities Will Start  
with Dinners and Meeting  
on January 4

NEW YORK, Jan. 2—Show week promises to be a busy time in this vicinity. With more than the usual number of important meetings scheduled, coupled with holding the show itself in the huge Bronx Armory at Jerome Avenue and 193d Street, the industry is prepared for all kinds of excitement from the time the show opens next Saturday afternoon until it closes on the night of the 12th.

Preliminary guns will be fired Friday night with a dinner given by the Bronx Automobile Dealers Association at the Concourse Plaza Hotel, which will be attended by such dignitaries as Samuel A. Miles, George M. Graham and others, and a "motor rodeo" dinner given at the Plaza by the Highways and Traffic Planning and Safety Committees of the National Automobile Chamber of Commerce. This will be for editors of general magazines and special writers, and will be built around the good roads cause.

### N. A. C. C. Committee Meetings

During the week of the show itself there will be many important meetings held. The N. A. C. C. alone has scheduled sessions for its Highway Transport, Foreign Trade, Traffic Planning and Safety, Taxation, and Motor Truck committees, and the directors also will hold their monthly meeting.

The truck makers will be much in the limelight on Monday, when there will be an all-day session devoted to discussion of matters particularly interesting to this branch of the industry.

The climax will come on Thursday, when there will be a joint meeting at N. A. C. C. headquarters of the Motor and Accessory Manufacturers Association, National Automobile Chamber of Commerce, National Automobile Dealers Association, American Automobile Association and the Rubber Association of America.

### Rubber Association Meeting

There will be the usual dinners, starting with the banquet of the Rubber Association on Monday night. The N. A. C. C. has scheduled its dinner for Tuesday night at the Commodore, and on Wednesday the Motor and Accessory Manufacturers Association will hold forth at the Astor. Although the annual meeting of the Society of Automotive Engineers will not be held here during show week, the Society intends holding a dinner, having selected Thursday night at the Astor.

There will be the usual number of luncheons and dinners given by the exhibitors, while another feature of the week will be a big meeting of the Na-

## MEETINGS, LUNCHEONS AND DINNERS TO BE HELD IN NEW YORK WHILE NATIONAL AUTOMOBILE SHOW IS IN PROGRESS THERE

NEW YORK, Jan. 2—Events taking place during the national show week in New York are announced as follows:

Jan. 5-12 National automobile show, Bronx Armory

### FRIDAY, JAN. 4

- 10:00 A. M.—National Automobile Chamber of Commerce Highway Transport Committee meeting, Yale Club.
- 7:00 P. M.—"Motor Rodeo" Dinner given by N.A.C.C. Highways and Traffic Planning and Safety Committees, Hotel Plaza.
- 7:00 P. M.—Show dinner given by Bronx Automobile Dealers Association, Concourse Plaza Hotel.

### SATURDAY, JAN. 5

- 10:00 A. M.—N.A.C.C. Highway Transport Committee meeting, Yale Club.
- 10:00 A. M.—Annual meeting of Automotive Electric Association, Yale Club.
- 2:30 P. M.—National automobile show opens.

### MONDAY, JAN. 7

- 10:00 A. M.—Convention of all motor truck manufacturers, N.A.C.C. headquarters.
- 1:00 P. M.—Ward M. Canaday press luncheon, Hotel Biltmore.
- 1:00 P. M.—American Automobile Association luncheon and meeting, Hotel Biltmore.
- 2:00 P. M.—Annual meeting Rubber Association of America, Astor Gallery, Waldorf-Astoria.
- 7:00 P. M.—Annual Banquet of Rubber Association of America, Waldorf-Astoria.
- 7:00 P. M.—Peerless Motor Car Co. dinner, Hotel Astor.

### TUESDAY, JAN. 8

- 10:00 A. M.—Meeting of United States Automotive Division with contact members of foreign trade committee, N.A.C.C. headquarters.
- 10:00 A. M.—National Automobile Chamber of Commerce directors' meeting.
- 12:30 P. M.—Chilton Co. luncheon, Commodore.
- 2:00 P. M.—Directors of National Automobile Chamber of Commerce attend Chilton Presentation at Commodore Hotel, to hear address on "Present Status of Automobile Industry" with charts by J. H. Collins of the Chilton and Class Journal companies.
- 6:00 P. M.—Dinner and entertainment for electrical service station operators in eastern district by the electric equipment manufacturers, Automobile Club of America.
- 6:30 P. M.—Annual N.A.C.C. banquet, Commodore.
- Meeting of Pierce-Arrow Motor Car Co. all day at Biltmore.

### WEDNESDAY, JAN. 9

- 9:30 A. M.—Meeting of Foreign Trade Committee of N.A.C.C. at headquarters.
- 10:00 A. M.—N.A.C.C. export managers convention at N.A.C.C. headquarters.
- 10:00 A. M.—N.A.C.C. Traffic Planning and Safety Committee meeting at headquarters.
- 10:00 A. M.—1 P. M.—Society of Automotive Engineers meeting and luncheon, motor boat section, Commodore.
- 12:00 Noon—Oakland Motor Car Co. luncheon, Commodore.
- 12:30 P. M.—Franklin Automobile Co. luncheon, Commodore.
- 12:30 P. M.—Auburn Motor Co. meeting and luncheon, Biltmore.
- 1:00 P. M.—Automobile Body Builders Association meeting, Waldorf-Astoria.
- 6:00 P. M.—Oldsmobile Co. of New York dinner at Commodore.
- 6:30 P. M.—Annual banquet of Motor and Accessory Manufacturers Association, Hotel Astor.
- 7:00 P. M.—Cadillac Motor Car Co.'s distributors' dinner, Hotel Astor.
- 7:00 P. M.—Oakland Motor Co. dinner, Biltmore.
- 7:00 P. M.—Chevrolet Motor Co. dinner, Commodore.
- 7:00 P. M.—Willys-Overland Co. dinner, Biltmore.

### THURSDAY, JAN. 10

- 9:30 A. M.—National Automobile Dealers Association meeting, Commodore.
- 2:00 P. M.—N.A.C.C. Taxation Committee meeting at N.A.C.C. headquarters.
- 3:00 P. M.—Joint meeting at National Automobile Chamber of Commerce with Motor and Accessory Manufacturers Association, National Automobile Dealers Association and Rubber Association of America at N.A.C.C. headquarters.
- 12 Noon—Stutz Motor Car Co. of America luncheon, Commodore.
- 12 Noon—Rickenbacker Motor Co. luncheon, Commodore.
- 12 Noon—Buick Motor Co. luncheon, Commodore.
- 6:30 P. M.—Society of Automotive Engineers dinner, Hotel Astor.
- 6:30 P. M.—Hupp Motor Car Corp. dealers' dinner, Commodore.
- 7:00 P. M.—First annual dinner of the Overseas Club of the Automotive Boosters International, Hotel Empire.
- 7:00 P. M.—Studebaker Corp. dinner at Hotel Plaza.
- 7:00 P. M.—Palge-Detroit Motor Car Co. dinner, Commodore.
- Dodge Brothers will not give a formal dealers' dinner, but will hold daily luncheons at the Pennsylvania Hotel.

tional Automobile Dealers Association, which will hold a New York session for the first time. The Automotive Electri-

cal Association also will meet here.

The show itself will have a total of  
(Continued on page 49)

## Templar to Produce "Six" as New Model

Will Replace "Four" of Old Company—New Dealer Contract in Force

CLEVELAND, Jan. 2—The Templar Motor Car Co., backed by new capital, with a new organization and personnel, has placed in effect a number of new policies and very shortly will be in production on a new model.

The new car will be a "six" and it will replace the "four" previously made by the old company. Many mechanical changes have been made in the design throughout. Four-wheel brakes, equalized in the front axle, will be regular equipment. The engine will have a seven bearing crankshaft.

Several of the new models are to be exhibited at the New York and Chicago shows, at which time a full announcement of mechanical details will be made, together with prices.

The new policies include a dealer contract with a number of unique provisions, such as a vote in factory affairs, perpetual franchise, protection from loss through price reductions and unused parts, etc. The factory guarantee on a number of parts has been extended in excess of the N. A. C. C. warranty.

## New Moon "Six" Model Will Be Priced at \$995

ST. LOUIS, Jan. 2—Moon Motor Car Co. is bringing out a new "six," which will be exhibited at the national shows. It will sell for \$995, the lowest price ever placed on a Moon car.

Preliminary models were disclosed to dealers and distributors at a recent convention, and complete details will be obtainable when the New York show opens.

The new car includes the same units as previous Moon models, including special Continental engine, Delco electrical system, Warner gearset, Borg & Beck clutch, Timken axles, etc.

The wheelbase on the new models is 115 in., 2 in. less than on the smaller of the current models.

## 2 New Models of Bodies Added to Kissel's Line

HARTFORD, WIS., Dec. 31—Kissel has announced two new closed models, to be known respectively as the seven-passenger "Berlin-Sedan" and the five-passenger "Victoria." The former resembles the "Brougham-Sedan" in general lines, but is mounted on 132 in. wheelbase chassis. The elliptical windows in the rear quarters are larger and the doors wider.

The new "55-Victoria" is a two-door type of body with a folding right front seat and a trunk rack integral with the

## 25 CAR MAKERS USE FOUR-WHEEL BRAKES

NEW YORK, Dec. 31—Twenty-five car manufacturers have definitely announced that their cars for 1924 are to be fitted with four-wheel brakes. Some of these cars have had them for some time, and the producers of the others have just recently disclosed their plans.

It is expected that at least ten additional makes will be fitted with this type of brake within a few weeks.

The following list of makes includes cars having four-wheel brakes as regular or extra equipment.

Anderson	Elgin	Peerless
Apperson	Gardner	Pierce-
Buick	Haynes	Arrow
Cadillac	Kissel	Ricken-
Chalmers	Locomobile	backer
Chrysler	Marmon	Rollin
Davis	Moon	Rubay
Duesenberg	Oakland	Stutz
Elcar	Packard	Templar

body. All windows can be lowered.

Hydraulic four-wheel brakes of the Lockheed type and 32 x 6 in. balloon tires are optional equipment at extra cost on all models, except the "Berlin-Sedan," on which these features are furnished as standard equipment.

Except for lengthening the frame of the "Berlin-Sedan" and the changes incidental to the use of four-wheel brakes, which includes addition of a hand brake on the gearset, the Kissel chassis remains practically unchanged.

## D. T. & I. Using Specially Built Cars for Shipments

DETROIT, Dec. 31—The Ford railroad, the D. T. & I., now has in service 1000 specially constructed box cars, which are designed to permit double decking closed car bodies in intershipment between body assembly and car assembly plants. In other than height the cars are the standard single sheathed forty-ton cars of the United States Railroad Association.

Inside measurements of each car are 40 ft. 6 in. long, 8 ft. 6 in. wide and 10 ft. high.

## Chandler Adds 2 Sedan Bodies to Closed Line

CLEVELAND, Dec. 31—Chandler Motor Car Co. has added to its line of closed cars two new sedans, one a four-door, five-passenger job, and the other a seven-passenger model. Both bodies are Fisher products.

Prices are as follows: Four-door sedan (five-passenger), \$1,895; seven-passenger sedan, \$2,095. The "Chummy Sedan" is now priced at \$1,745 instead of \$1,785.

## Receivers Operate Herschell-Spillman

Company Consents to Adjudication—Assets Totaling \$2,236,827 Are Reported

BUFFALO, Jan. 2—Following an involuntary petition in bankruptcy filed by creditors against the Herschell-Spillman Motor Co. in the United States District Court here, Harold D. Wilson and Lawrence P. Hancock of Buffalo were appointed receivers, with instructions from the court to operate the plant until further ordered.

The company consented to an adjudication and the same was made, the case being referred to Judge George D. Judson at Lockport.

The company reports assets of approximately \$2,236,827. Its good will is estimated at \$211,174. Its current liabilities are figured at \$589,000; fixed liabilities at \$888,000, and odds and ends, \$31,000.

The receivers believe that a satisfactory organization will be worked out and that, with the business in sight, the company will be able to weather its financial difficulties successfully.

## New Buick Body Models Will Be Put on Display

FLINT, MICH., Jan. 2—Buick will exhibit for the first time at the New York show three new body models termed respectively the "Country Club Special," the "Town Car" and the "Limousine," all of which are mounted on the 128-in. wheel-base, six-cylinder chassis. The first mentioned lists at \$1,945. It is a coupe with a large compartment having a door opening at the side just forward of the fender.

The town car, which lists at \$2,795, is on the lines of a cabriolet with an elliptical window under a landau bow in the rear quarter and no roof over the driver's compartment. The "limousine" resembles a berlin in general construction. Its f.o.b. price is \$2,385. It seats seven and is practically the same as the seven-passenger sedan except for the glass partition which separates the driver's from the passenger compartment.

## New Nash "Special Sedan" to Be Exhibited at Show

KENOSHA, WIS., Jan. 2—Nash Motors Co. announces that it will exhibit for the first time at the New York show a new body model, known as the "Special Sedan" which will be mounted on the six-cylinder 121-in. wheelbase chassis and will list at \$1,640. Upholstery will be in blue mohair, and equipment includes clock, heater and silk curtains.

Other closed models, including the four-door "Coupe," the "Victoria" and the "Carriole," will be continued by the company.



## Men of the Industry and What They Are Doing

### Bradley Takes Dealership

Myles F. Bradley, who has been director of publicity for Durant Motors, Inc., since its organization, will go into the selling end of the business in the near future. He has taken a dealership for the Flint in a part of Westchester County and a section of Connecticut adjoining the New York State line. His headquarters probably will be at Portchester. Mr. Bradley will retain his connection with the personal executive staff of W. C. Durant and will be consulted on questions of publicity. He had nearly twenty years of newspaper experience before joining the Durant forces. He sold a half interest in one of the Flint dailies to go with Mr. Durant a few months before he retired from General Motors, and went with his chief to aid in the formation of Durant Motors.

### Willis Studebaker Export Head

George E. Willis has been appointed manager of export sales for the Studebaker Corp. to fill the vacancy caused by the advancement of H. S. Vance to the post of domestic sales manager. Mr. Willis' connection with Studebaker began in 1911, when he was named manager of the Berlin branch. In 1914 he was transferred to Russia and in 1917 he became manager of the Studebaker branch in Des Moines. The following year he left the organization, but returned in 1921 to handle the Studebaker branch in Cleveland, where he was located when the call came for him to take up his new position as export manager.

### Banta Succeeds Drumpleman

A. J. Banta, one of the well-known figures of the industry since its inception, has been named general sales manager of the Rickenbacker Motor Car Co., a position which has been vacant since the resignation of W. C. Drumpleman, who became Rickenbacker distributor in Cleveland. Mr. Banta will be in charge of all sales work, both domestic and foreign, working under T. V. Rickenbacker, vice-president in charge of sales.

Recently Mr. Banta has been vice-president and general manager of the Clydesdale Motor Truck Co., Clyde, Ohio. Before that he was identified with the Maxwell organization, during the regime of Walter Flanders, being assistant to Mr. Flanders. Later he was president of the Maxwell Sales Co. of Chicago, and for twelve years was an executive of the Locomobile Co. of America, terminating his work with that concern as manager of all branches in Ohio.

### Shaw in Advertising Work for Ford

D. Minard Shaw, formerly advertising manager and assistant sales manager of Earl Motors, and later with Courier Motors Co., has been placed in charge of advertising for Ford Motor Co. in the

New York division. This territory includes New England, Washington, Philadelphia, Buffalo and Pittsburgh. Mr. Shaw will be located at the New York executive offices, 1710 Broadway.

### Briggs Made Bank Director

Walter O. Briggs, president of the Briggs Manufacturing Co., has been made a director of the Security Trust Co., Detroit. In addition to his position as head of the Briggs company, one of the largest body building companies in the industry, Mr. Briggs is also actively connected with other industrial and financial interests. He is also a director of the Merchants National Bank, Detroit.

### Jacoby Now With Chandler

Kelly R. Jacoby, formerly sales manager of the Willys-Overland Co. and later vice-president and sales manager of the Earl, has been appointed southern sales manager of the Chandler Motor Car Co. Mr. Jacoby, who has been Chandler special representative in the field for some time, takes charge of a new district created by a redivision of territory, so that he will cover Virginia, Tennessee, Arkansas, Oklahoma, Texas (except the El Paso area) and all States South of these. Chandler's eastern district is under Frank E. Connor and the western territory, of Ralph B. Nettleton.

### Meese and Kelly Go to Mexico

H. S. Meese of the Commercial Truck Co. of Philadelphia and J. F. Kelly, Jr., of the Electric Storage Battery Co., will leave New York on Jan. 31 for a trip to Mexico and Cuba, reaching Mexico City on Feb. 6 and Havana on Feb. 20.

### Elected Bank Directors

W. R. Wilson, former president of Maxwell Motor Corp., and Henry I. Ewald, president of the Campbell-Ewald Co., advertising counsel, have been elected directors of the Bank of Detroit.

### Martin Joins Penn Spring

W. F. Martin, president of the Amco Manufacturing Co. of Indianapolis, has resigned to become sales manager of the jobbers division of the Penn Spring Works of Baldwinsville, N. Y. This company, which was organized in 1879 and which has been manufacturing chassis springs for both wagons and automobiles for nearly a half century, is about to bring out a new line of automobile bumpers.

### Willys Gets Loving Cup

When John N. Willys celebrated his fiftieth birthday anniversary recently, the men at the plant in Toledo presented him with a silver loving cup and testimonial containing the names of the leaders in his factory organization.

## Big Outlay Planned by Ford This Year

Will Spend \$110,000,000 to \$115,000,000 on Improving and Expanding Plants

DETROIT, Jan. 2—The expenditure of from \$110,000,000 to \$115,000,000 for expansion and improvement of plants is planned for 1924 by the Ford Motor Co.

These plans include the development of an all-water route from Green Island, N. Y., where the company has completed a plant for the manufacture of radiators, gears and other parts; the completion of the St. Paul plant; an addition to the Kansas City plant, and other development work.

Outlining its expansion policy, the company also says:

Plans have been completed and construction is about to begin early in the year on a new assembly plant at Philadelphia. About Feb. 1 production is to begin at the new Hegeswich plant near Chicago, where, in addition to the assembly of 600 cars and trucks per day, all closed bodies required in the Chicago district will be manufactured.

The west coast is regarded as especially well prepared to handle the large volume of business expected in 1924 as a result of additions made to the Los Angeles assembling and manufacturing plant during the past year.

The Ford expansion program for the south is reflected in the completion in 1923 of the new assembly and body plant at New Orleans and an addition to the plant at Atlanta, Ga. Other extensions are contemplated for the south during 1924.

An addition will be built to the Kansas City assembly plant, increasing its floor space 168,000 sq. ft., and a new sales and service branch at Salt Lake City, on which construction has begun, will be completed in April.

## Rickenbacker Launches Wide Export Campaign

DETROIT, Jan. 3—Announcement is made of the appointment of R. L. Bearden as export manager of the Rickenbacker Motor Car Co. and simultaneously the launching of an extensive campaign for foreign business.

An export campaign has been worked out in which the Rollin Motors Co. of Cleveland is participating, and under which the products of both companies will be pushed, either individually or in smaller cities, as a composite line.

Five experienced export salesmen have been appointed and now are en route to their respective territories or are already working. The territories assigned are South American and Latin republics, Canada, Continental Europe, the Orient and Australia, and South Africa.

## Ricardo Patents Sold Waukesha Motor Co.

**Licenses Will Be Granted Not  
Only for America but for  
Entire World**

WAUKESHA, WIS., Jan. 2—The Waukesha Motor Co. of this city has purchased the Ricardo patents covering a type of cylinder head designed to create turbulence of the mixture, which, it is claimed, produces more power and higher efficiency. The company will grant licenses for the manufacture of this design of cylinder head and combustion chamber not only for America but for all other countries.

Negotiations were completed in October, when Henry L. Horning, general manager of the Waukesha company, with legal counsel, made a hurried trip to England for this purpose. It had been known for several years that Mr. Horning had been working very closely with Harry Ricardo, internal combustion expert of Shoreham, England, on turbulence and combustion chamber design, and the Waukesha laboratory has been carrying out extensive research and development work along this line.

Engineers will recall that Mr. Ricardo addressed the Society of Automotive Engineers on turbulence and related subjects at the annual meeting two years ago.

## Horning Will Show Engine at S. A. E. Section Meeting

INDIANAPOLIS, Jan. 2—F. F. Chandler, chairman of the Indiana Section of the Society of Automotive Engineers, announces that on the occasion of the address on "Motor Performance and Foreign Type Motors," by Harry L. Horning of the Waukesha Motor Co., the evening of Jan. 17, there will be an added feature.

In the afternoon of that day Mr. Horning will exhibit and operate at the experimental laboratory of the Wheeler-Schebler Carburetor Co. here an engine with the so called Ricardo type of combustion chamber. This engine will also be described and its performance given considerable space in Mr. Horning's address.

The results of Mr. Horning's study during his recent European travel will be given at some length during the paper, and the Indiana Section, through Mr. Chandler, has extended an invitation to engineers who may not belong to it to participate during the day and evening.

## BUFFALO S. A. E. MEETING

BUFFALO, Jan. 2—"Engines for Oil vs. Oil for Engines" will be the topic of a discussion scheduled for the Feb. 4 meeting of the Buffalo Section of the Society of Automotive Engineers. L. H. Pomeroy will present the engineers' point

## NEW AUTOMOBILE ERA PREDICTED BY FORD

DETROIT, Dec. 28—The dawning of the new year sees the automobile coming into a greater era of popularity, declares Ford Motor Co. in statement issued this week.

The statement is based upon reports from all sections of the country and upon dealer estimates for 1924. These indicate not only a growing condition of prosperity but a greater tendency toward the use of the automobile both as a passenger carrying vehicle and for commercial haulage.

Spring buying is expected by the company to start earlier than in previous years, and as a result the customary car shortage period is expected to come several weeks earlier than previously.

of view, and A. Ludlow Clayden of the Sun Oil Co. will lead the opposition for the lubricating oil men. Winter contamination of oil and disputed points of viscosity and solidification will be among the topics coming up for settlement. The meeting will be held in the Statler Hotel.

## Court Authorizes Audit of Victor Page Motors

STAMFORD, CONN., Jan. 2—United States District Court Judge Edwin S. Thomas has ordered an audit of the books of the Victor Page Motors Corp., following the petition of Connecticut stockholders representing shares amounting to \$100,000, who asked for the appointment of a receiver.

The stockholders also want the plant, which is subject to a mortgage of \$50,000, now due, sold and the proceeds distributed among the creditors.

Counsel for the corporation claimed at the hearing, which was held in Norwalk, that the proceeding is an effort on the part of a group of stockholders to obtain control of the company.

## Lee Tire Makes Changes in Old Republic Factory

AKRON, Jan. 2—The plant and personnel of the former Republic Rubber Co. at Youngstown are being changed considerably by the Lee Tire & Rubber Co., which purchased the plant several months ago preparatory to increasing production materially during the first few months of the year.

It is estimated that the company will employ 600 additional men and women within the next few weeks and bring production close to capacity.

The Lee company has made no announcement regarding the amount of money to be spent in reshaping the plant and business, but officially it is stated that sufficient will be spent to make the plant meet all present competition.

## Willys Sees Farmer as Buyer This Year

**Declares That Present Conditions  
Justify Outlook for 4,000,000  
Output**

TOLEDO, Jan. 2—Basing his estimate on the business outlook, John N. Willys, president of the Willys-Overland Co., predicts that "there is ample justification for the preparations that the automobile industry is making for the building of 4,000,000 cars during 1924."

Mr. Willys also forecasts new records in all lines of business, which, he declares, is more truly normal than at any time since the war.

Mr. Willys's production plans call for 30,000 cars a month during the first quarter and he says that dealer contracts on hand make it safe for him to expect that the production of the first quarter will be continued throughout the year.

## Cities Big Buyers in Past

Casting the automobile horoscope for 1924, Mr. Willys says:

Under existing conditions it is only natural that we have been going through twelve months of a remarkable buying market. That market was expected by the automobile industry as a whole and its anticipation came true. The buying, however, was largely done in the cities. The possibilities in the rural districts still are unplumbed. Automobile statistics show that the farm market for motor cars still is largely undeveloped, compared with the rest of the country. Although the farmer owns 30 per cent of all the automobiles yet this is not his proportionate share on the basis of population.

Rural districts show only seventy cars per thousand of population as compared with 127 per thousand in the towns and cities of 1000 and upward. Analysis discloses that the ownership of motor cars is proportionately heaviest in the villages of 1000 to 5000, which have but 9 per cent of the total population, yet own 20 per cent of the total automobiles, or one motor car to every 4.4 persons.

From these figures, it would appear that the farming territory continues to offer the best future market. No occupation gets more value out of a motor car than does the farmer, and figures indicate that a large percentage of this market remains unsupplied.

It is this vast outlook for automobiles that furnishes the necessary fundamental facts for the prediction that 1924 will be another in a series of peak years in the automobile industry.

## NASH GIVES \$340,000 BONUSES

MILWAUKEE, WIS., Jan. 1—The Nash Motors Co., with main works in Kenosha, Wis., and a four-cylinder division in Milwaukee, distributed in excess of \$340,000 in holiday gifts and bonuses to its entire staff of employees. In addition to a percentage bonus of the annual salaries and wages, each worker was presented with a crisp new \$10 bill. The number of employees is about 5500.



## Stocks Accumulating Slowly with Dealers

Expected that Movement in This  
Direction Will Be Started  
This Month

NEW YORK, Dec. 31—With sales somewhat slower in December than in November and with a number of large producers down for inventory, the output of automobile manufacturing plants experienced a normal curtailment for the month. Those plants not affected by the inventory taking period observed elsewhere maintained good production marks, all employees being at work and no lightening of activities noted.

December will register a higher total than the same month of last year and will round out an extended period during which new production records were made and an unprecedented annual output of motor vehicles was reached. During the period, extending back to March, when manufacturing got into full swing, schedules have been maintained at a uniformly high rate. The full year has been one of remarkable achievement, featured by exceptional output and equally exceptional sales.

### Demand Has Kept Up Well

Stocks have been accumulating slowly both at factories and with dealers, the latter as yet having done but little stocking for spring sales. Beginning in January a general movement on the part of dealers in this direction is expected in order to preclude the possibility of a shortage of cars in the spring. The general keeping up of demand has halted any movement that might have been apparent of an accumulation of stocks for this purpose.

The attention of the industry, generally, is turned toward New York, where the first of the National shows will take place during the early part of January. The show will prepare the way for a return to high production marks by all producers and a definite setting forth of schedules for the new year by those manufacturers who have made no announcement of their programs up to the time of the show opening.

There will be many new models of cars displayed, some of which have already been placed on public view and others that will be seen for the first time. This annual show, being the first of the important exhibits, has always proved a strong stimulus to renewed buying.

## "FACTS AND FIGURES" IN PRELIMINARY SURVEY PUTS VALUE OF MOTOR VEHICLE OUTPUT IN 1923 AT \$2,510,885,000

NEW YORK, Jan. 3—A preliminary digest of the annual "Facts and Figures" of the National Automobile Chamber of Commerce has been issued by General Manager Alfred Reeves.

This estimates 1923 production as 4,014,000, of which 3,644,000 are passenger cars and 370,000 trucks.

The combined wholesale value is \$2,510,885,000. The wholesale value of parts and accessories, exclusive of tires, is \$1,310,000,000, and of tires, \$760,000,000. This makes a total of \$4,580,885,000 for these three branches of the industry.

Following is a table in which are given the high lights of the annual statistical statement of the Chamber:

PRODUCTION			
Cars and trucks.....	4,014,000	Per cent of rubber supply used by automobile industry .....	70%
Cars .....	3,644,000	Per cent of plate glass supply used by automobile industry.....	36%
Trucks .....	370,000	Per cent of copper supply used by automobile industry .....	14%
Previous record motor vehicle production, 1922..	2,659,064	Per cent of aluminum supply used by automobile industry.....	25%
Percentage increase over 1922 .....	50%	Per cent of iron and steel supply used by automobile industry.....	4%
Production of closed cars	1,235,000	Per cent of upholstery leather supply used by automobile industry....	54%
Per cent closed cars.....	35%	Gasoline consumed by motor vehicles, 1923 (gals.)	5,404,184,000
Total wholesale value of cars .....	\$2,243,385,000	MOTOR BUS AND MOTOR TRUCK	
Total wholesale value of trucks .....	\$267,500,000	Number of motor buses in use.....	51,000
Total wholesale value of cars and trucks.....	\$2,510,885,000	Number of consolidated schools using motor transportation .....	12,500
Tire production.....	45,000,000	Number of street railways using motor buses	107
Wholesale value of motor vehicle tire business...	\$760,000,000	Number of railroads using motor vehicles on short lines .....	157
Total wholesale value of parts and accessories, exclusive of tires.....	\$1,310,000,000	EXPORTS	
Average retail price of car, 1923.....	\$811	Number of motor vehicles exported .....	328,333
Average retail price of truck, 1923.....	\$1,080	(From U. S. factories and Canadian plants owned in U. S. A.)	
Purchasing power of automobile dollar (1913=100)	111 cents	Number of motor cars exported .....	189,884
Number of persons employed in motor vehicle and allied lines.....	2,750,000	Number of motor trucks exported.....	37,049
Special Federal excise taxes paid to U. S. Government by automobile industry in 1923.....	\$155,000,000	Number of assemblies abroad of American cars .....	101,400
		Value of motor vehicles and parts exported.....	\$234,129,000
REGISTRATION		(Including engines and tires.)	
Motor vehicles registered in U. S. (approx.).....	14,500,000	Rank of automobiles and parts among all exports	6th
Motor cars.....	12,880,000	Per cent of motor vehicles exported .....	8%
Motor trucks.....	1,620,000	Imports of motor vehicles	890
World registration of motor vehicles.....	17,000,000	MOTOR VEHICLE RETAIL BUSINESS IN U. S.	
Per cent of world registration owned by U. S. A.	85%	Total car and truck dealers .....	43,607
Motor vehicle registration on farms.....	4,250,000	Public garages.....	50,911
Motor cars.....	3,890,000	Service stations and repair shops.....	67,802
Motor trucks.....	360,000	Supply stores.....	65,988
Miles of improved highway .....	430,000		
Total miles of highways in U. S.....	2,941,294		
AUTOMOBILE'S RELATION TO OTHER BUSINESS			
Number of carloads of automobiles, parts, and tires shipped over railroads .....	750,000		

Indicative of the business done by the industry during the year is a report by members of the Motor and Accessory Manufacturers' Association which shows that for the eleven months of this year sales aggregated \$581,985,020, against \$421,324,000 for the full year of 1922.

### GEARLESS OFFICERS GUILTY

PITTSBURGH, Dec. 29—R. R. Starnes, Frank E. McClintock and Duncan McDonald, officials of the Gearless Motor Corp., on trial on a charge of using the mails in a scheme to defraud and of conspiracy, have been found guilty by a jury in the Federal court.

## 13,795 Motor Vehicles Exported in November

Total Trucks Shipped Exceeded  
Any Month of 1923 with  
Exception of July

WASHINGTON, Dec. 31—A total of 10,875 passenger cars and 2920 motor trucks, having a value respectively of \$8,437,410 and \$2,012,584, were exported from the United States during the month of November, according to an official announcement from the Automotive Division of the Bureau of Foreign and Domestic Commerce.

In addition, shipments of parts and accessories had a valuation of \$4,295,902, with an additional \$103,683 for automobile unit assemblies and \$121,245

for automobile service appliances.

The exports of passenger cars are thus shown to have been continued through November at practically the average monthly rate set earlier in the year, although the actual total was higher than that of August, September and October. Truck shipments, on the other hand, were the largest of 1923, excepting July, when 3105 were exported.

Statistics setting forth the November exports from the Canadian plants and the foreign assembly of Ford vehicles have not been announced, but it is assumed here that these were in keeping with the trend shown in the exports from the United States.

### One Receiver to Handle R. H. Long Motors Affairs

BOSTON, Dec. 28—Following a second hearing on the R. H. Long Motors Co. financial affairs at a meeting of

creditors in the Federal District Court yesterday, Judge Lowell named Guy Murchie receiver for both the motor company and the R. H. Long Co. This is a victory for Mr. Long, apparently, because Martin T. Hall of Natick, counsel for the manufacturer, made a strong plea that this be done.

Mr. Hall stated that this was the only fair thing to do because the business could be continued and pay dollar for dollar if properly handled at this time. "Two receivers would mean bankruptcy," he stated emphatically.

Mr. Murchie has been acting as temporary Federal receiver.

There appeared to be strong opposition to the appointment of William W. Caswell, who has been acting as temporary State receiver. Attorney William Silverman, representing unsecured creditors, stated that Mr. Caswell's name had been advanced solely by his personal counsel, the banks and the State court petitioning creditors.

## Exports, Imports and Reimports of the Automotive Industry for November of Current Year and Totals for Eleven Months Ending November 30

EXPORTS								
Month of November				Eleven months ending November 30-				
	No.	Value	No.	Value	No.	Value	No.	Value
	1922		1923		1922		1923	
Automobiles including chasses.....	6,145	\$4,832,778	13,814	\$10,472,245	69,999	\$54,067,745	139,946	\$96,984,324
Electric trucks and passenger cars.....	67	82,124	19	22,251	276	387,589	185	271,206
Motor trucks and buses, except electric:								
Up to 1 ton.....	556	236,185	2,332	942,282	6,768	2,763,122	18,055	6,685,925
Over 1 and up to 2½ tons.....	207	269,651	412	606,313	2,253	2,831,420	3,841	4,701,457
Over 2½ tons.....	38	98,839	176	463,989	651	1,813,788	891	2,216,467
Total motor trucks and buses except electric .....	801	604,675	2,920	2,012,584	9,672	7,408,330	22,787	13,603,849
PASSENGER CARS								
Passenger cars except electric:								
Value up to \$500 inclusive.....			3,672	1,297,476			48,686	17,236,400
Value up to \$800.....	3,098	1,605,051	2,619	1,738,933	37,937	18,556,913	27,231	18,021,099
Value over \$800 and up to \$2,000.....	2,040	2,154,067	4,347	4,733,173	20,266	22,266,896	38,521	40,842,063
Value over \$2,000.....	139	386,861	237	667,828	1,848	5,448,017	2,536	7,009,707
Total passenger cars except electric.....	5,277	4,145,979	10,875	8,437,410	60,051	46,271,826	116,974	83,109,269
PARTS, ETC.								
Parts, except engines and tires*.....	14,882,229	3,304,171			146,987,077	34,880,901		
Automobile unit assemblies*.....			618,735	103,683			24,021,791	3,820,579
Accessories, parts*.....			24,685,618	4,295,902			221,969,314	49,825,041
Automobile service appliances (not elsewhere specified)*.....			295,762	121,245			1,851,911	941,008
Station and warehouse motor trucks.....	2	970	19	19,341	130	132,917	215	115,209
Trailers .....	39	29,529	19	13,383	452	215,221	950	333,269
Airplanes.....	1	500			37	156,630	44	305,151
Parts of airplanes except engines and tires*	2,583	3,393	12,700	8,951	470,798	264,664	273,060	58,003
BICYCLES, ETC.								
Bicycles and tricycles.....	3,139	20,452	3,023	30,882	12,233	128,782	26,663	219,931
Motorcycles .....	1,440	347,368	1,633	422,425	14,539	3,711,481	20,425	4,878,851
Parts except tires*.....	227,148	137,420	293,485	177,049	2,678,656	1,453,818	3,032,627	1,587,488
INTERNAL COMBUSTION ENGINES								
Stationary and Portable Engines:								
Diesel and semi-Diesel .....	74	7,361	214	32,279	239	151,243	1,094	412,150
Other stationary and portable.....	2,040	249,391			23,116	2,969,796		
Not over 8 hp.....			2,774	259,979			26,582	2,489,566
Over 8 hp.....			306	152,318			2,245	1,232,957
Automobile Engines.....	2,293	295,582			43,206	4,857,222		
Motor trucks and buses.....			20	5,068			2,976	343,255
Passenger cars .....			1,474	287,637			36,047	4,718,606
Tractors .....			4	2,695			2,369	573,091
Aircraft .....	29	7,800	32	10,152	130	71,419	74	51,769
Accessories and parts*.....	442,876	198,702	669,707	274,741	6,309,983	2,490,123	7,275,307	3,168,391
IMPORTS								
Automobiles and chassis (dutiable).....	56	67,284	64	73,354	419	693,480	806	834,606
Other vehicles and parts for them (dutiable) .....		86,916		39,619		676,252		1,718,410
REIMPORTS								
Automobiles (free from duty).....	282	384,332	42	56,620	1,661	2,659,060	2,228	2,598,339
*Pounds.								

\*Pounds.



## A. E. Barker, Maxwell Vice-President, Dies

Death Results from Peritonitis—  
Formerly Associated with  
Dodge Brothers

DETROIT, Jan. 3—Arthur E. Barker, vice-president and in charge of sales of Maxwell and Chalmers cars, died this morning from peritonitis, being stricken last Friday night.

Mr. Barker was in the industry for fifteen years. Previous to his Maxwell connection he was a prominent sales executive of Dodge Brothers, and prior to becoming identified with the automobile world, he was in charge of the telephone industry in Michigan.

Mr. Barker was forty-eight years of age and is survived by a widow and one son, the latter a student at Andover.

## New York Stage Prepared for Annual National Show

(Continued from page 43)

525 exhibitors, of which seventy-four will be motor car manufacturers, including seven makes of taxicabs. All of the complete car exhibits will be made on one floor, together with a majority of the 225 exhibits of accessories, the overflow of the latter being placed on the east side of the balcony. This will be the first one-floor display of complete cars since the industry was in its infancy.

The cars to be exhibited are:

American, Anderson, Apperson, Auburn, Barley, Buick, Cadillac, Case, Chalmers, Chandler, Chevrolet, Cleveland, Cole, Collins, Columbia, Davis, Dodge Brothers, Dort, du Pont, Durant, Elcar, Elgin, Essex, Flint, Franklin, Gardner, Gray, H. C. S., Haynes, Hudson, Hupmobile, McFarlan, Maxwell, Moon, Nash, National, Marmon.

Oakland, Oldsmobile, Overland, Packard, Paige, Peerless, Pierce-Arrow, Premier, R & V, Reo, Rickenbacker, Roamer, Star, Stearns, Stephens, Studebaker, Stutz, Tempstar, Velie, Westcott, Wills Sainte Claire and Willys-Knight.

The taxicabs include Checker, Dodge Brothers, Premier, Rauch & Lang, Reo, Roamer and Yellow Cab.

## Boosters' Overseas Club to Be Formally Launched

NEW YORK, Jan. 2—The Overseas Club of the Automotive Boosters International will be formally organized at a dinner to be held at the Hotel Empire in this city on Jan. 10, in connection with the annual automobile show.

The club will be composed of export executives, sales managers and representatives of American companies manufacturing automotive equipment and accessories, and its purpose is to provide an agency through which its members may discuss the various problems having to do with the growing sales throughout the world of automotive accessories and equipment.

Organization of the new club has been undertaken by a committee composed of H. L. Kraus, export manager for the Apco, Biflex and Simmons companies; R. A. Rodriguez of Rodriguez & Co.; C. E. Murrell of the Electric Storage Battery Co.; Walter Rinck of Stevens & Co., and Charles H. Moulton and George E. Quisenberry of El Automovil Americano.

## Motor Truck Committee Announces Its Program

NEW YORK, Jan. 2.—Secretary Edward F. Loomis of the National Motor Truck Committee of the National Automobile Chamber of Commerce announces the full program of the meeting of truck manufacturers set for Jan. 7, as follows:

"What Can Be Done to Improve the Standard of Truck Paper," S. G. Rosson, Commercial Credit Co., Baltimore.

"Bus Operation by Electric Railway Companies," W. J. Flickenger, Connecticut Co., New Haven.

"Status of the Motor Truck Industry," J. H. Collins, the Chilton and Class Journal Companies.

"The Pennsylvania Railroad's Experiment in Moving Freight by Motor Truck," R. S. Hurd, special agent, Pennsylvania Railroad.

"Progress in Building the Nation's Highways," Thomas H. MacDonald, chief of United States Bureau of Public Roads.

"Common Carrier Laws and Legislative Problems," Harry S. Meixell, secretary, Motor Vehicle Conference Committee.

## Wilmer Makes Comment on Loss of "Dixmude"

NEW YORK, Jan. 2.—In a statement regarding the disappearance of the French rigid airship Dixmude, made through the Aeronautical Chamber of Commerce, E. G. Wilmer, chairman of the Goodyear Tire & Rubber Co., which recently acquired the rights of Luftschiffbau-Zeppelin for the construction of lighter-than-air craft in this country, says in part:

As far as available facts now go, there is nothing in the experience of the Dixmude to reflect on the ability of the rigid airship to cope with storm conditions given sufficient fuel and an experienced crew. The present accident is of course very unfortunate, but it will be doubly unfortunate to speculate on its cause or the lessons to be gained until all the facts are at hand.

## Factory of Latex Tire Co. at Fond du Lac to Reopen

FOND DU LAC, WIS., Jan. 1.—Rehabilitation of the Latex tire factory at Fond du Lac, Wis., which suspended operations a short time ago because of the lack of adequate working capital, has been effected. The Latex Tire Co. of Fond du Lac has been incorporated in Wisconsin with a capital of \$100,000, as the operating concern.

The Latex Tire & Rubber Co. will be continued as the holding company. It has given the new concern a 10-year lease of its plant and equipment at a satisfactory figure. Operations will be resumed on or before Feb. 1.

## Moline Discontinues Plant at Rock Island

Tractor Line Produced There Unprofitable—Follows New  
Policy of Company

MOLINE, ILL., Dec. 29.—In line with its recently announced policy of the elimination of the unprofitable lines of its industry, the Moline Plow Co. has announced suspension of its harvester line, manufactured at Poughkeepsie, N. Y., and its tractor line in the Universal Tractor plant at Rock Island, Ill. Press dispatches from the East, which indicated wholesale suspension of the Moline Plow Co. industry, however, were flatly contradicted by George W. Peek, president of the company.

Contracts for the disposal of such equipment in both plants as the Moline Plow may care to offer have been entered into, and the new policies became effective Jan. 1. Business in the strictly tillage lines has been better than in many years, officials of the company claim, and they view 1924, with a wider application and test of the Moline plan of sales distribution, with extreme confidence.

Mr. Peek's statement follows:

We will discontinue the manufacture of harvesters at Poughkeepsie which has long been unprofitable. We will discontinue the manufacture of tractors at Rock Island, which likewise has been unprofitable.

Contracts have been made with Samuel L. Winternitz & Co. and Michael Tauber & Co., both of Chicago, for the sale of such equipment as we care to dispose of at both of these plants.

Contracts have been entered into for the supply of repairs with the Standard Motor Parts Co. of Detroit.

We are now figuring upon manufacture of mowers and rakes in our Stoughton plant. The manufacture of our tillage line in the plow factory at Moline, wagons, spreaders and hay tools at Stoughton, and drills and other seeding machinery in Minneapolis will be continued. Business in these lines is good—better than it has been for a number of years—and the success of the company upon these retained lines and under the Moline plan is assured.

## M. A. M. A. Will Broadcast Banquet Entertainment

NEW YORK, Jan. 2.—A unique feature of the annual banquet of the Motor and Accessory Manufacturers Association at the Hotel Astor, Jan. 9, will be the broadcasting through Station WEFB of the entire entertainment, which starts at 9:45 and lasts until 12:15.

Among the celebrities secured for this entertainment by Sidney S. Meyers, attorney for the association and who always manages this part of the banquet, are Suzanne Keener from the Metropolitan Opera House, Jean Gerardy, the Belgian 'cellist; John Charles Thomas, baritone, and W. C. Fields, the comedian. In addition one act of the play, "Mr. Battling Butler," will be given.

## SATISFACTORY CONDITIONS IN EAST

### New York

NEW YORK, Dec. 31—The continuance of excellent motoring weather throughout the month, a large number of Christmas deliveries of motor cars and a widespread public confidence in the stability of business combined to make December one of the best in the experience of New York motor car dealers.

Business in all price classes and in practically every individual salesroom ran far ahead of the same month last year and reached approximately 60 per cent of the November sales volume, which was also far above normal for that time of the year.

Dealer sentiment concerning the merchandising power of the Bronx show has ranged from indigo pessimism to the heights of optimism, but it is encouraging to note that as the time of the show draws nearer and Metropolitan dealers have been able to gauge public sentiment, they are feeling more sanguine.

The same conditions that have made December a good new car month have contributed to making it a good used car month. Stocks, on the whole, are very little larger than in November and appreciably lower than at this period last year.

### Philadelphia

PHILADELPHIA, Jan. 2.—The retail situation in new cars as the new year begins is characterized by leaders in the local trade as, on the whole, decidedly satisfactory. Not only is the general volume of sales estimated to be considerably better for December than for the corresponding month of 1922, but there is less reserve stock on hand. Collections are reported as fair to good.

The outlook for spring is of the best. There has been no sudden let-down for months and the recession in sales during the unavoidably dull periods has been gradual and normal.

One point that helps dealers assume a cheerful viewpoint for a spring is that inquiries are coming in large numbers from farmers who usually make liberal purchases at such a time, following a profitable year. A considerable number of farmers and others located in the rural districts and small towns and villages have begun to buy small cars of the lower-priced types and to make prompt payments.

### Baltimore

BALTIMORE, Jan. 2.—The usual decrease in business which comes every December was noticeable in Baltimore, but the dealers are of the opinion that the decline was due entirely to the season. The business for the month was slightly under that of November and some report it below December of 1922 by a narrow margin.

Baltimore dealers look toward the spring with a feeling of confidence and express the belief that the business will be better than it was during the corresponding period of last year. Dealers are conservative in their stocks, buying only up to their needs.

There has been some improvement in the used car situation, due principally to the fact that a great many of the dealers have fewer used cars on hand. Some of the dealers show a decided tendency to tighten up on their used car business and the results are reported satisfactory.

### Indianapolis

INDIANAPOLIS, Jan. 2.—Although December has been almost a minus zero for some Indianapolis dealers, especially in light cars, others dealers have forced good sales of closed cars.

The Indian summer which lagged into December is blamed by dealers, who generally register good closed business at this season. The entire month for the city is conceded to have been no better than November.

Not much increase in sales is expected now until after the Chicago show, but the dealers generally are not dismayed by the let-up. Up to November sales were very good. It has been a good year, and the orders that are not coming at this time will be made after the Chicago show and sound spring trade is expected.

There is not much change in the used car situation. Some gains have been made in some quarters in cutting down used stocks, but as a rule the used car market has been fully as slow as the new car trade. The first ten days of December registered the bottom of the sales drought in many lines, and the latter part of the month picked up with a considerable volume of Christmas trade.

Optimism is expressed by distributors generally regarding spring trade in rural centers. Some dealers with new lines or with especially attractive moderate priced new models have already begun to sign up new dealers throughout the State. Orders for spring deliveries are also beginning to come in, and all eyes are looking forward. No one sings the blues in spite of slow present sales.

### Salt Lake City

SALT LAKE CITY, Jan. 2.—Business is at least normal for the season with new models selling best. The outlook for this spring is better than for the last few years, the industrial situation throughout the territory being highly satisfactory, particularly in Utah.

The used car market is fair for December. Small cars are moving best. Firms pushing used Fords are doing better in some cases than last winter.

### Boston

BOSTON, Jan. 2.—Christmas slowed up sales in Boston during the latter part of the month. It had been a sort of wavy period from November, sales going up for a few days and then slipping off. By the middle of the month the average had been good, then the dealers in the higher priced cars found that prospects were putting them off until after the holiday season.

With the medium priced class the sales reported were fair, while the lower priced cars were going along very well for the dealers who had continued their consistent advertising. Orders for spring delivery continue to hold up very well.

Used cars are being sold by the dealers who are putting forth extra efforts to get rid of the stock they have on hand. Other dealers, who are allowing things to go along without requesting their salesmen to put in some extra efforts, report slow sales.

### Cincinnati

CINCINNATI, Jan. 2.—An unexpected and unprecedented slump in retail automobile sales here during the last few months rather discouraged local dealers. This depression affected both the new and the used car market, but particularly the latter, as for the last few weeks there was a spurt of new car buying for Christmas.

Dealers attribute this slackening to the belief that the public is probably awaiting a reduction in prices.

Notwithstanding the fact that the coming twelve months will be a presidential year, a majority of local automobile firms are looking for a better-than-average volume of business, basing their prediction on their belief that manufacturers' prices will hold at their present level.

Commercial vehicle sales have been more nearly normal during the last month than passenger car business. Money is relatively free and collections are fair.

### Minneapolis

MINNEAPOLIS, Jan. 2.—While several circumstances work against an upturn in the automobile trade the outlook is declared by distributors to be on the mend.

Dealers are already signing up for the year, and with growing betterment in general business conditions there are prospects for a good spring. Owing to an increase of three-fourths of 1 per cent in Minnesota registration charges and the fact that it is foolish to register a car this late in the year buyers are delaying purchasing influenced apparently by the psychology of the situation.

The used car situation is hindered in this territory by the fact that there is no sale for these cars in the fall when prospects with old cars feel they are not getting a fair trade.



## SALES HOLD UP WELL THROUGH SOUTH

### Dallas

DALLAS, Jan. 2.—Texas retail automobile dealers have closed one of the most prosperous years in the history of their activities.

The December business was as good as the dealers expected. A number of cars moved on the strength of "buy-a-car-for-Christmas" campaigns and others were sold because there was a general market for automobiles. Some dealers reported difficulty in obtaining new cars readily and said this hampered their business.

The used car problem continues to be serious. It is estimated that 60 per cent of the new car sales were on the trade-in basis.

Texas dealers are optimistic over the prospects for spring business. There appears to have been no material let up in demand in most sections of the State and the retailers are not expecting any for sixty days. The business in the rural districts has been better for the last three months than at any time for years. It will continue good for thirty days the retailers say. After that the trade in agricultural belts will decline somewhat.

### Birmingham

BIRMINGHAM, Ala., Jan. 2.—Retail automotive sales in Birmingham and most of Alabama have been holding up to the high standard of the early fall months insofar as new cars are concerned, but used cars are causing the dealers throughout this section more concern every day.

The one big problem of the dealers of this section is the used car.

General conditions point to excellent business during the coming spring. Debts have been reduced and most of its citizens are actually in better shape than they were last year.

This does not apply to the Birmingham district, however, where conditions are not so good as last year, but are now showing signs of improvement. On the whole, however, the only thing to keep the dealers of this section from making new sales records is lack of an outlet for the used cars they take in trade. With a general improvement in industrial employment this may be provided.

### Louisville

LOUISVILLE, Ky., Jan. 2.—Louisville dealers are well situated as the new year opens. This applies to those handling standard makes and who have cut their eye teeth in the business. Surplus stocks of used cars are loaded on the hands of the newer dealers and those who are reaching out for business with an off-brand car.

December sales received a spurt during the holiday season with a marked tendency toward increased demand for

the higher priced makes. There is still some business going on although it is generally quiet. Outside of a few dealers who are heavily loaded with used cars the trade is not at all downhearted over the slowing up of business for the last two months.

### Buffalo

BUFFALO, Jan. 2.—Business was better with automobile dealers here during December than it was in the corresponding month of 1922. With the retailers of popular medium-priced cars it was considerably better.

All distributors here are optimistic as to the outlook for the new year. Some of the old-timers say there was never a December since they have been in business in which the prospect for a good year was more encouraging.

The used car business in all priced lines is reported to be satisfactory.

### Columbus

COLUMBUS, Jan. 2.—Prospects for business in 1924 are very good, according to the opinions of distributors and agents in Columbus and central Ohio. While there was a slight lull during the holiday period, this was no more marked than usual.

The spring outlook is believed to be good in every way. All lines of business, including farming, show continued prosperity, and as a result it is believed that the desire for automobiles and the ability to buy will be fully up to the records of the first part of 1923, and possibly somewhat better.

The used car situation showed a slight improvement last month. Strenuous efforts on the part of salesmen and agents during the holiday season brought about a reduction in the number of used cars on the market. With dealers as a rule following a better policy on taking in used cars, the situation is not expected to become more complicated.

### Seattle

SEATTLE, Jan. 2.—Nineteen twenty-three was a considerably better year for Puget Sound dealers than the previous year, and distributors of standard cars have made plans for increasing allotments.

Activity in the lumber industry and improved business conditions generally, marred only by farmers' conservatism in buying, indicate more money available for cars this year. Dealers in higher priced cars feel optimistic. Truck demand will be good.

The used car situation is serious, despite unusual selling methods. One firm offers 500 gal. of gasoline or \$80 bonus on the purchase of a used car of a certain price and 1000 gal. on higher priced used cars.

### Chicago

CHICAGO, Jan. 2.—Although the year which has just closed has been by far the best in the history of the automotive industry for the retail dealers in Chicago, the last week witnessed a falling off to the low point of the year. Since Christmas new car sales have slowed up, and as to the used car market, there is no such thing.

Many dealers have been making intensive efforts to move large stocks of used cars without much success. Owing to the extremely demoralized condition of the used car market, there has been some increase in the number of foreclosures on cars sold on time, some owners feeling that they will come out better by cancelling future payments and purchasing a used car.

Dealers in the more popular lines of cars agree, however, that sales right up to the present have been considerably better than for the corresponding period last year, despite the fact that they have fallen off greatly from two or three months ago.

There is a feeling that the new year will be as good or better than the year just closing. January is not expected to show much improvement, but preparations for spring business are based on the expectation that pocketbooks will loosen up after the Chicago show.

### Des Moines

DES MOINES, Jan. 2.—Retail automobile conditions in Des Moines were unusually good during December. In fact many local dealers report that the month just closing was the best December that they have ever known. This was partially the result of unusually fine weather conditions, as there has been no snow and at no time has the thermometer registered below 20 degrees above zero.

In addition to favorable weather conditions, another important factor was a better feeling not only among prospects but among dealers themselves. Observers generally agree that prospects for at least the first six months of 1924 look bright and there is every indication of a good business during the period. Competition is unusually keen and leading dealers are expecting to have to fight for business during this period as they have never done before.

The used car situation is another story, as the situation at present is far from satisfactory. Stocks are abnormally high and prices are low with indications of going lower. As evidence of the large stocks of used cars being carried, a survey of dealers in Iowa of a moderate priced car (not Ford) shows that there were during the past week practically twice as many used cars on hand as there were at the same time in 1922.

Business in light delivery cars is good but heavy trucks are not moving.

## \$6.67 Share Earned by Hudson Last Year

Net Income Transferable to Surplus Account Reported to Be \$8,003,624

DETROIT, Jan. 2.—Gross profits from sales of cars and parts of the Hudson Motor Car Co. for the year ended Nov. 30 last was \$14,472,351, which, after allowing for other income and after deduction of expenses and taxes, left a net income transferable to surplus account of \$8,003,624. After dividends and adjustment of Federal taxes for prior years the company had a total surplus on Nov. 30 of \$9,459,979.

Total assets of the company, according to the consolidated balance sheet, are \$27,386,747. Current assets, including cash in banks, are \$5,354,485; inventories, \$6,453,355, and \$4,000,000 in United States notes. Plant assets are placed at \$10,050,271. Current liabilities are \$3,582,367 and capital stock is valued at \$13,201,000.

In his report, President R. B. Jackson says:

Operations during the fiscal year have been profitable and sound. Net income after all taxes and depreciation aggregated \$6.67 a share or over 43 per cent on invested capital.

Notwithstanding costly preparations for placing on the market Dec. 1 in which increased volume an entirely new six-cylinder Essex model which involved many additions to machine shops and major alterations throughout factories, the company's financial strength and working capital have been substantially improved over last year.

The annual meeting of the company will be held Jan. 15.

## Suit Brought by Timken Against Gilliam Settled

CANTON, OHIO, Jan. 2.—The legal controversy between the Timken Roller Bearing Co. and the Gilliam Manufacturing Co. has been satisfactorily settled, a joint statement issued by the two companies says.

The statement in full reads as follows:

The case of the Timken Roller Bearing Co. against the Gilliam Manufacturing Co., which involved claims of the respective parties set forth in their pleadings, was terminated today by a decree which was agreed upon by all parties.

When the case was reached for trial in the Common Pleas Court at Canton, Ohio, a conference was entered into between the parties and their attorneys, in which conference both sides took the position that a fair and complete statement of the various contentions might lead to a satisfactory adjustment and thereupon full discussion was had.

It was agreed that the Timken company had spent large sums of money in developing special machinery to be used in its roller bearing business, and this was especially true of its rotary hearth furnaces and its automatic roll grinding machines.

In equipping the factory of the Gilliam Manufacturing Co., that company had sub-

stantially duplicated such roll grinding machines and such rotary hearth furnaces and consequently the decree as agreed upon provides that within the period of eighteen months one-half of the machines of these two types installed by the Gilliam Manufacturing Co. shall be dismantled and that within a further period of six months the remainder of such furnaces and machines shall be dismantled and thenceforward that company is enjoined from using similar furnaces and machines; but it is further provided that the Gilliam Manufacturing Co. shall be free to purchase in the open market machines with which to do the work of such furnaces and roll grinding machines, or it may design and perfect machines for such purposes, but any machinery to be designed by the Gilliam Manufacturing Co. shall not embody the same construction as the two machines of the Timken Roller Bearing Co. above mentioned.

All other matters in controversy between the two parties, including their respective claims for damages and for an accounting are dismissed.

## FINANCIAL NOTES

Willys-Overland Co. reports net earnings of \$13,393,538 for the first eleven months of 1923. After allowing for \$4,630,395 accumulated dividends on the preferred stock to Sept. 30, this is equal to \$4.05 a share on the outstanding 2,159,985 shares of \$5 par common. The earnings equaled more than \$60 a share on the 220,495 shares of 7 per cent preferred stock.

Hupp Motor Car Corp. shows net profits of \$1,940,011 for the nine months ended Sept. 30. The balance sheet shows assets valued at \$20,376,896, which includes: cash, \$1,076,337; United States certificates, \$100,000; sight drafts cars in transit, \$1,802,826; parts protected by dealers' deposits, \$174,832; inventory, \$5,699,778.

Martin Parry Corp. reports for the nine months ended Sept. 30, net profits of \$563,871, after all deductions for interest charges, taxes, and other accounts. This is equal to \$5.63 a share earned on the 100,000 shares of capital stock of no par value outstanding. In the same period last year the company earned \$3.18 a share.

Reo Motor Car Co. has increased its capitalization to \$20,000,000 with the filing of amended articles of incorporation as authorized by the recent stockholders' meeting. The increase of \$5,000,000 will be taken care of by transfer from surplus to capital.

McCord Radiator & Manufacturing Co. reports net earnings in excess of \$800,000 for the first eight months of the year. This is \$16 a share on the 50,000 shares of Class A stock outstanding on a \$3 annual dividend basis.

Indiana Truck Corp. has declared its regular quarterly dividend of 1½ per cent on the preferred stock, payable Jan. 1, 1924, to stock of record Dec. 31, 1923.

Gray & Davis has declared the regular quarterly dividend of 2 per cent on the preferred stock, payable Feb. 1 to stock of record Jan. 21.

## DELLING TO PRODUCE STEAMER

PHILADELPHIA, Dec. 29.—E. H. Dellling, at one time designer for Mercer and also connected with the engineering department of the Stanley steamer, heads the Dellling Motors Co., 2401-2415 Chestnut Street, which is bringing out a steam car to operate on kerosene or gasoline.

## BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

A feature of retail trade last week was the expected recession from the peak of pre-holiday activity, accentuated somewhat by the continued mild weather for this time of the year. These recessions were less pronounced, however, than in wholesale lines and in industry.

Car loadings in the week ended Dec. 15 showed a seasonal decline. They numbered 899,522, comparing with 913,774 in the preceding week and 879,052 in the corresponding week last year. On Dec. 14 there were 216,936 surplus freight cars available for service, 19,808 more than a week before. Income reports so far received for November indicate a slight gain in earnings over a year ago.

Business failures reported to Bradstreet's last week totalled 348, as against 440 the week before and 368 a year ago.

Domestic production of crude petroleum in the week ended Dec. 22 was practically unchanged, the estimated daily average exceeding the figures for the previous week by only 950 barrels. A number of advances in prices of crude oil and gasoline were made last week.

The Fisher index of wholesale commodity prices advanced 1 point last week to 151. Bradstreet's index of food prices rose 3-10 of one per cent and stood 4.8 per cent below the figure for the corresponding week last year.

The cost of living, as measured by the latest index compiled by the National Industrial Conference Board, is higher than at any time since May, 1921.

The final report of the Federal Reserve Banks for 1923 shows for the year a slight gain in gold, but a loss of \$11,000,000 in total reserves.

## Receiver Is Liquidating Affairs of Ogren Motor

MILWAUKEE, WIS., Jan. 1.—Liquidation of the affairs of the Ogren Motor Car Co. of Milwaukee, which for several years manufactured the Ogren Six, but has been inactive for the last six months, is proceeding with the appointment of a receiver by the Milwaukee county circuit court on the petition of the Cleveland (Ohio) Hardware Co.

The Ogren company was organized in 1917 by Hugo W. Ogren of Chicago, formerly prominent in racing circles, and established a factory in Milwaukee, manufacturing a car selling for about \$4,000 in a standard phaeton type. Mr. Ogren retired from the company some time ago and returned to Chicago.

Most of the machine shop and tool equipment has been sold to the Huffman interests of Elkhart, Ind., which have transferred it to their axle plant at Barton, near West Bend, Wis., formerly the works of the Barton Axle Co., defunct. The remaining assets will not be liquidated.



## Continental Netted \$2,180,453 in Year

### Only Part of Progress Made by Company Reflected in State- ment of Earnings

DETROIT, Jan. 2.—Continental Motors Corp. reports profits from operations for the year ended Oct. 31, 1923, of \$3,886,195, which after deduction for interest charges and depreciation leaves a net profit before tax provision of \$2,180,453. Substantial and healthy progress has been made during the year, President R. W. Judson declares, only part of which is reflected in the statement of earnings.

Organization of manufacturing facilities for larger quantity production of low priced passenger car engines absorbed a major part of the corporation's earnings, Mr. Judson reports. This program of expansion, now definitely completed, has been amply justified by the increasing demand of the public for low-priced transportation.

#### Engine Output Doubled

During the year 237,000 engines were manufactured and sold—more than twice the output in any previous year. For the current fiscal year production is estimated at 300,000 engines of all types, using 75 per cent of present plant equipment. Current and subsequent earnings should, therefore, be substantially increased, Mr. Judson declares.

Research laboratories, designing and engineering departments have been used to a greater extent by customers than ever before. Important improvements and refinements in design have been developed. The entire range in sizes and capacities of four- and six-cylinder engine types are now included in the product. Sales of parts increased 43 per cent over the previous year, and 107 parts stations now handle distribution for the company.

Deduction from earnings of \$1,208,195 for depreciation of plants and equipment appears large, declares Mr. Judson, but is in line with the conservative policy of the company to maintain facilities at high efficiency for low cost production. Net plant investment was increased \$1,540,700, principally at Muskegon, to provide latest equipment for more economical production.

#### Provision for Federal Taxes

Addition of \$671,076 to inventory is in balance with the company's extended production facilities. Notes and accounts payable aggregate \$1,359,759 more than last year, due principally to the retirement of preferred stock and increase in liquid assets. Full provision has been made for Federal taxes for this and previous years, says Mr. Judson, and all differences with the Government have been satisfactorily concluded.

On Jan. 15, 1923, the entire outstanding amount of preferred stock, \$2,015,500, was retired. On April 1, 1923, \$750,-

000 in principal amount of serial gold notes was paid on maturity. Interest charges on preferred stock have thus been eliminated, says Mr. Judson, and on serial gold notes substantially reduced. The surplus now of \$7,617,247 is the largest in the corporation's history.

Present indications, concludes Mr. Judson, justify the expectation that customers' requirements during the current year will tax the company's enlarged productive capacity. With this increased volume of business favorably reflected in earnings, early dividend action should thus be made possible.

The consolidated balance sheet as of Oct. 31 shows net property investment of \$22,380,798; investments (at cost), \$159,787; current assets, \$11,829,421; deferred charges to future operations, \$378,601, for a total of assets of \$34,748,608. Principal items of current assets are inventories, \$8,471,729; accounts receivable, \$1,669,192; cash, \$1,541,299. Current liabilities total \$5,914,448.

## INDUSTRIAL NOTES

Schoitz Tool, Gear & Machine Works, Waterloo, Iowa, has installed additional machines to take care of its business in disassembling, rebuilding and reassembling automobile tractor engines. In occupying its new plant it has doubled the space it had in its recent location.

Abel Steam Vaporizer Co. has located its plant in Mediapolis, Iowa, and will manufacture Abel's steam vaporizer, the invention of Dr. J. F. Abel of this city. S. B. Matson is general manager of the company.

Auto-Hone Co., Inc., Buffalo, has taken over the manufacture and selling of the HaLee crank pin tool, which formerly was made in Kansas City.

### A. C. MacLachlan, Veteran in Paint Division, Dies

BUFFALO, Dec. 28.—The death of A. C. MacLachlan, superintendent of the painting department of Pierce-Arrow Motor Car Co. for more than twenty years, has removed one of the best known figures in the paint division of the industry.

Starting in 1875 with Cunningham & Sons, Rochester, after serving his apprenticeship, he remained there four years and then moved to Buffalo to become superintendent of painting for J. B. Sweet & Sons, carriage manufacturer. He remained there until 1893 when he joined the Pitts Agricultural Works, and in 1896 became identified with the George N. Pierce Co., later the Pierce-Arrow company.

He resigned there five years ago to take a pleasure trip to Australia. His health failed after this trip, and his death resulted following a long illness.

As a craftsman Mr. MacLachlan possessed unusual knowledge of automobile painting materials and processes, and he had exceptional talent for producing the highest class automobile paint work, all of which gave him an outstanding position in his particular field.

## METAL MARKETS

Sufficient orders from the automotive industries accumulated on the books of steel mills during the closing days of the old year served to impart to the market considerably more backbone than it has displayed in some time. This holds especially true of sheets. It is said that since the leading manufacturer of low-priced passenger motor cars obtained a \$5 per ton concession on full-finished body sheets, the 5.35c. base price has become rigid. Moreover, the concession referred to resulted from specifications and deliveries quite different from the ordinary run of full-finished sheet orders and, therefore, permitting of certain economies in production.

By far the greater part of the sheet buying was accompanied by specifications, and sales managers are confident that before the new year has become a few weeks old additional orders will come into the market for February and March shipments. The sheet bar market is firm at \$42.50. Some price shading in soft steel bars has taken place, but cold-finished bars are firm. Good-sized tonnages of alloy bars are reported to have been sold to passenger motor car builders at full prices. Some improvement in the demand is also reported by strip mills, and while the market could hardly be characterized as firm, mills would probably look for more attractive specifications than they did a month ago, before considering price concessions.

While most of the steel mills diminished activities over the holidays, there are few instances of more prolonged suspensions of activity for repairs, such as have been customary at this time in former years. For some time there has been noted in the steel market a better sentiment.

If the January demand shows a quickening of the consuming pace, it will be difficult to repress an advancing price tendency, although the dominant market factors will certainly look askance at such a movement. The program of the latter continues to be one of maintaining prevailing quotations.

**Pig Iron.**—Reports of a hardening in prices in some of the markets, especially Chicago, are not reflected in any quickening of interest shown by automotive foundries. It looks, however, as though a period of slow recovery was in sight. A reduction of 50 cents per ton in the 1924 ore price from that of 1923 is predicted.

**Aluminum.**—It is quite evident that considerable demand, although probably none of the individual requirements are large in extent, remains to be satisfied this month. Quite a few automotive consumers sought last month to get a line on what certain holders or intermediaries in the outside market were asking, and deferred action under the sentimental restraint which the last few weeks of a year invariably impose on buying. Announcement that the French producer has changed his sales representation in the United States is of interest because it denotes at least some interest in the American market. Quotations remain unaltered.

**Copper.**—Breaking up of the Copper Export Association portends keen competition among the copper producers in both the home and foreign markets. Production is at a high rate. Automotive orders for copper and brass products have been numerous in the last few weeks, and many negotiations are pending.

# Calendar

## SHOWS

Jan. 5-12 New York, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Eighth Coast Artillery Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Salon, Hotel Drake.

Feb. 4-9—Chicago, Tenth Annual National Motorcycle, Bicycle and Accessory Show, Broadway Armory, under the auspices of the Motorcycle and Allied Trades Association, A. B. Coffman, secretary.

## FOREIGN SHOWS

April 2-13—Barcelona, Automobile Exposition, under the auspices of the Confederación de Camaras Sindicales Espanolas del Automovillano y Ciellismo, Palacio de Arte Moderno.

Aug. 23-Sept. 6—Toronto, Ont., National Automobile Show

in conjunction with the Canadian National Exhibition under the sanction of the Canadian Automotive Equipment Association and the Automotive Industries of Canada.

## RACES

Aug. 3—Lyons, France, European Grand Prix.

April 27—Trapani, Italy, International Automobile Race.

## CONVENTIONS

Jan. 5—New York City, Annual Meeting, Automotive Electric Association.

Jan. 14-18—Chicago, Annual Convention and Show of the American Road Builders' Association, the former to be held in the Congress and the latter in the Coliseum.

Jan. 30-31—Chicago, Fourth Annual Meeting of the Automotive Electric Service Association, Congress Hotel.

Jan. 31-Feb. 1—Rochester, N.Y., Winter Sectional meeting of the American Society for Steel Treating, Hotel Seneca. W. H. Elsenman,

secretary, 4600 Prospect Avenue, Cleveland.

May, 1924—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

June, 1924—Washington, Pan American Highway Congress, under the auspices of the Pan American Highway Mission.

## S. A. E. MEETINGS

January—The following sections will not hold meetings in January but will concentrate on the annual meeting of the Society in Detroit, Jan. 22-25: Cleveland, Detroit, Metropolitan, Mid-West, Washington and the proposed Milwaukee Section.

Jan. 9—Motorboat Meeting and Luncheon, Hotel Commodore, New York, 10 a. m.

Jan. 10—Annual Dinner of the S. A. E., Hotel Astor, New York, 6.30 p. m.

Jan. 17—Indiana Section, Motor Performance, H. L. Horning, Hotel Severin, Indianapolis, 8 p. m. Dinner, 6.30 p. m.

Jan. 22—Dayton Section, Research in Improving Handling and Utilizing Rubber Latex, B. J. Lemon, Dayton Engineers Club, 8 p. m. Dinner 6.30 p. m.

Jan. 22-25—Annual Meeting of the S. A. E.—Detroit.

Jan. 23—"The Carnival," Oriole Terrace, Detroit, 9 p. m.

Feb. 4—Buffalo Section, Engines for Oil vs. Oil for Engines, L. H. Pomeroy, A. Ludlow Clayden, Statler Hotel, Buffalo, 8 p. m.

Feb. 14—Indiana Section, Motor Tests and Research Work, C. P. Grimes, Hotel Severin, Indianapolis, 8 p. m. Dinner 6.30 p. m.

Feb. 14—Metropolitan Section, Vehicle Depreciation.

March 13—Metropolitan Section, Replacement Parts and Accessories.

April 17—Metropolitan Section, Fleet Maintenance, F. W. Winchester.

May 15—Metropolitan Section, What Roads and Steels Do to Automobiles.

## License Collections Restrained in Ohio

COLUMBUS, Jan. 2.—Judge E. B. Kinkead in the Franklin County court has granted a temporary restraining order against the collection of license taxes on motor trucks of more than 30-hp. The restraining order is effective until Jan. 7, when the case is to be heard.

The restraining order was granted at the request of truck operators of Cleveland who have formed the Ohio Motor Truck Club to resist what they believe to be unreasonable license fees for motor trucks. The suit ultimately will go to the Ohio Supreme Court for a final decision.

Under the new law 5-ton trucks will have to pay a license fee of \$180 as compared with \$20 last year. There are 145,000 trucks in use in Ohio and at least 50,000 are above the 30-hp. limit.

## Indiana Law Invalid.

INDIANAPOLIS, Dec. 29—Indiana's 1924 motor vehicle license fee law was today declared to be unconstitutional by the Circuit Court at South Bend.

The new law with its heavy increases on trucks, heavy passenger cars and buses would have brought more than \$3,000,000 additional revenues to the State highway department.

The increase on light cars was \$3 and heavier cars would have paid in some cases about \$24 instead of the \$8 they have been paying.

The point in question was the inclusion in the motor vehicle license fee bill of matters relating to the withdrawal of funds from inheritance taxes from the highway department.

## HAWKEYE TIRE RESUMING

DES MOINES, IOWA, Jan. 2—The Hawkeye Tire Co., after a lengthy period of suspension is resuming production.

The plant will abandon the fabric product and confine itself to cord tires, of which it will have capacity of about 600 a day. The sales territory will be confined largely to Iowa, although present agencies in other States will be supplied. The plant will add a truck tire, 40 x 8, to its standard size and also produce a balloon tire under the name four-ply comfort tire.

## Mason to Put Bedford Plant Into Operation

AKRON, Jan. 2—Mason Tire & Rubber Co. will start the new year by placing its Bedford, Ohio, plant, formerly the Owen Tire & Rubber Co., in production with approximately 400 men and women employed, according to information given out by D. M. Mason, vice-president and general manager.

The Bedford plant has been idle for several months, while the Kent plant has been on a greatly reduced production scale. The company recently placed its fabric mill at Kent into operation on a small scale.

## Seiberling's Barberton Factory on 3-Shift Basis

AKRON, Jan. 2—Seiberling Rubber Co. is reported officially to be operating part of the Barberton plant on a three-shift basis and producing in the neighborhood of 1500 tires and 2000 tubes a day.

The new production ticket increases a former low mark by between 15 and 25 per cent. The company as yet has made no plans, so far as is known, to start production in its New Castle, Pa., plant.

Several weeks ago it was stated that Seiberling was to devote entire factory facilities to making of the all tread tire which the company perfected and placed upon the market a year ago.

## Automotive Exports Are Third in Value

WASHINGTON, Jan. 2—Automotive exports for nine months of 1923 exceed in value those of any other manufactured product. Unmanufactured cotton and coal are the only materials sold abroad more extensively than automobiles and parts. Addition of the tire figures to automotive totals would put automotive exports in second place.

The value of automobiles and parts exported in the first nine months of 1923 was \$121,318,000, while foreign business in tires amounted to \$14,686,000. Agricultural implements and machinery come next in the list of completed manufactured units, with a total of \$40,001,000, although they stand seventeenth in the list given by the Foreign Commerce Department of the United States Chamber of Commerce.

Such products as lubricating oils and cured hams stand midway between, together with semi-finished material, such as iron and steel sheets, cotton cloth and copper ingots.

Automobiles and parts, exclusive of tires, comprised 4.2 per cent of the value of exports from January to September, inclusive.

## 1924 Pulitzer Air Races Will Be Held in Dayton

DAYTON, OHIO, Jan. 2—Colonel F. P. Lahm, chairman of the Contest Committee of the National Aeronautic Association, announces that the 1924 Pulitzer air races will be held here. The Dayton committee plans to increase the prize money from \$15,500 to \$50,000, and also to augment the number of events to be arranged for the three-day meet. Tentative dates selected are Oct. 2 to 4.